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# USSR Report

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BIOMEDICAL AND BEHAVIORAL SCIENCES

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23 March 1984

USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

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RUST FUNGI IN LENINGRAD OBLAST

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA, BIOLOGIYA in Russian Vol 15,  
No 3, Aug 83 pp 54-60

SYCHEVA, T. P. and CHEREPANOVA, N. P.

[Abstract] Rust fungi are among the most widespread inducers of plant diseases. In the present paper an attempt is made to catalogue various species of rust fungi in Leningrad Oblast. During 1980-1981 a total of 253 species of Uredinales were identified. The most frequently found species belonged to Puccinia family followed by Uromyces, Phragmidium, etc. Several of these fungi were noted for the first time in this area. These fungi were found on 406 different plants; 227 of them were beneficial, while 32 were noxious or even poisonous. The fungi found in Leningrad Oblast were also spread through Europe, Asia and even in North America. References 3 (Russian).  
[186-7813]

EFFECT OF CARTOLIN ON FROST RESISTANCE OF WINTER WHEAT

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 30, No 2, Mar-Apr 83  
(manuscript received 16 Aug 82) pp 360-364

BOCHAROVA, M. A., TRUNOVA, T. I., SHAPOVALOV, A. A. and BASKAKOV, Yu. A.,  
Institute of Plant Physiology imeni K. A. Timiryazev, USSR Academy of Sciences;  
All Union Scientific Research Institute of Chemical Plant-Protective Agents,  
Moscow

[Abstract] A new synthetic compound of the cytokinin type - cartolin - was investigated as an agent for induction of frost resistance in plants. Winter wheat Mironovskaya 808 was used in this study, spraying the plants when they were already in the tillered phase of growth for optimal effect. When the plants were sprayed 20 days prior to exposure to frost with a 1.0 kg/hectare dose of cartolin, a 17% increase in frost resistance was observed. When this treatment was performed 7 days prior to frost exposure, the effect was much lower, statistically indistinguishable from controls. Hence, cartolin seems to be a long-lasting reagent affecting structural and functional organization of

the cells. When compared to controls, treated plants exhibited a higher ratio of dry weight to raw weight, a higher content of sugars and soluble proteins and an absence of changes connected with stretching and hydration of cells. References 17: 11 Russian, 6 Western.  
[203-7813]

UDC 632.937

#### CORN SALAD ATTRACTANTS FOR CLICK BEETLE LARVAE

Moscow BIOLOGICHESKIYE NAUKI in Russian No 6, Jun 83  
(manuscript received 8 Dec 81) pp 32-34

IVASHCHENKO, I. I., Krasnodar Vegetable and Potato Experimental Selection Station

[Abstract] Studies were conducted on the possible use of corn salad (*Valerianella dentata*) or its extracts as a bait for the click beetle (*Selatosomus latus*). Testing of a variety of extracts of the roots, stems, and leaves of the salad demonstrated that wheat seeds impregnated with an ethanol extract constituted the most powerful attractants. Field studies were also conducted which demonstrated the predilection of the beetle larvae for the roots of the corn salad in preference to other available weeds. References 6: 5 Russian, 1 Western.  
[143-12172]

UDC 595.70-147.8:547.38.02

#### ISOLATION AND IDENTIFICATION OF SEX PHEROMONE COMPONENTS OF COTTON-BALL WORM (*HELIOTHIS ARMIGERA*)

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 10, Oct 83  
(manuscript received 27 Dec 83 [sic]; in revised form 1 Mar 83) pp 1422-1428

KONYUKHOV, V. P., KOVALEV, B. G. and SATTAR-ZADE\*, N. R., All-Union Scientific Research Institute of Biological Plant Protection, Kishinev; \*Azerbaijan Scientific Research Institute of Plant Protection, Kirovobad

[Abstract] Studies were conducted on the chemical nature of sex pheromone isolated from the posterior abdominal segments of the cotton-ball worm *Heliothis armigera*. The use of a combination of gas-liquid chromatography and mass-spectrometry led to the identification of the following components in a ratio of 5:3:2:1:1: cis-11-hexadecenal, cis-11-tetradecenal, cis-11-hexadecenol, cis-11-tetradecenol, and cis-11-hexadecenol acetate. Field trials demonstrated that combination of the two major components cis-11-hexadecenal and cis-11-tetradecenal in a ratio of 3:1 was the most potent attractant for male and mature, virginal female cotton-ball worms. Addition of the other minor components was without any telling effects; however, occasional males responded to cis-11-hexadecenol. Figures 1; references 13: 6 Russian, 7 Western.  
[183-12172]

POPULATION GENETICS OF RUST FUNGI IN RELATION TO CREATION OF RESISTANT  
WHEAT VARIETIES

Moscow BIOLOGICHESKIYE NAUKI in Russian No 5, May 83  
(manuscript received 3 May 82) pp 86-90

SMIRNOVA, L. A.

[Abstract] Evaluation of the conditions favoring dissemination of rust fungi in Northern Caucasus and the characteristics of the pathogen population, in combination with the bank of effective resistance genes in the wheat varieties, suggests that wheat breeding for specific-race resistance will not be successful. Under the conditions prevailing in the Northern Caucasus attempts at the selection of resistant wheat varieties have to rely on a combination of effective Sr and Lr genes along with genes for nonspecific resistance. A successful application of this approach requires accurate prediction on the long-term basis of dynamics of the races and biotypes of the pathogen, and the development of adequate mathematical models for making such predictions. References 7: 4 Russian, 3 Western.  
[179-12172]

LIMITATIONS OF BACKCROSSING IN SELECTION OF WHEAT RESISTANT TO PUCCINIA  
STRIIFORMIS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 5, May 83  
(manuscript received 17 Feb 82) pp 91-95

ANPILOGOVA, L. K.

[Abstract] Backcrossing was studied in relation to improving the resistance of Stepnaya 135 wheat to Puccinia striiformis. The results showed that this method was of limited utility with respect to the phytopathogen in question, since a stable homozygotic family could not be obtained among the F<sub>2</sub> hybrids after 1, 2, or 3 backcrosses, and the segregation did not follow classical genetic patterns. The number of resistant plants fell sharply with an increase in the number of saturating crosses, and even cases of complete loss of resistance to the yellow rust fungus have been encountered. Consequently, creation of isogenic lines will have to be based on a better understanding of the transmission of resistance genes and their combinations with other genes in backcrosses. References 9: 4 Russian, 5 Western.  
[179-12172]

## RESISTANCE OF RICE TO PIRICULARIOSIS

Moscow ZASHCHITA RASTENIY in Russian No 10, Oct 83 pp 23-25

DZYUBA, V. A., director, plant selection department, PODKIN, O. V., FROLOVA, V.S. and SINGIL'DIN, G. A., senior scientific workers, All-Union Scientific Research Institute for Rice and PRAVDIVETS, N. N., junior scientific worker, Primorskiy Branch of the institute

[Abstract] The present study reports on research into dominant genes "Piricularia resistance", which have polygen effects in controlling resistance to individual fungus strains. The authors discuss phases of infestation with the pathogen *Piricularia oryzae* and development of hybrids to withstand the pest in the Soviet Union. Field tests at the All-Union Scientific Research Institute for Rice over many years have determined that some 25% of tested hybrids were not susceptible to the disease, while 35% were moderately susceptible and over 40% were readily susceptible to it. Strains developed and distributed for use include "Spal'chik", "Start", "Solyaris", "Solnechnyy" and "Al'tair". Some foreign hybrids that were useful in developing hardy strains include "Tadukan", "Zenit", "Kaloro", NP 125, "Sha-Tiaotsao", "Te-Tep", "Kanto 51", "Dular", "Uzen 5552" and "Raminad". Climatological, fertilizer and pesticide factors in preventing piriculariosis are also discussed. In crop rotation, rice should follow legumes rather than grains or plantings in newly cultivated fields. Recommended pesticides are cineb or ricide upon first noting the disease; newly developed topsin-M is also effective.

[224-12131]

UDC 632.913.2

## STATE AND TASKS IN INTRODUCING AND ACCLIMATIZING ENTOMOPHAGES OF QUARANTINE AND PARTICULARLY DANGEROUS PESTS

Moscow ZASHCHITA RASTENIY in Russian No 10, Oct 83 pp 35-36

IZHEVSKIY, S. S., department director, All-Union Scientific and Technical Institute for Quarantine and Plant Protection

[Abstract] Entomophages are used to control plant pests either through maximizing their useful properties, introducing them to new regions or acclimatizing them to new conditions. The author discusses various entomophages that have been introduced into the Soviet Union, either from its own isolated territories or from abroad. These include types that control various apple, pear and peach pests and the Japanese beetle found in Primorskiy kray and on the island of Sakhalin. Efforts are under way to use these entomophages to supplement and restrict use of chemical agents. San Jose scale and *Leucaspis japonica* are being controlled with *Prospaltella perniciosi* for the benefit of citrus and fruit trees in the Trans-Caucasus. *Scutellista cyanea* has been introduced from France to control *Ceroplastes japonicus* in Azerbaijan, Georgia and Krasnodarskiy kray. Entomophages of the citrus butterfly *Dialeurodes citri* and various fruit scales have been introduced from India, France and other

countries. Recently a parasite of tea leaf scale has been introduced from North America, and enemies of the Colorado beetle have been identified for use, including *Edovum puttleri*, described by American entomologists in 1981. Attempts to control the white moth with imported enemies have failed, apparently due to domestic competitors. Efforts continue to control the Eastern fruit moth and the potato moth by these biological means. Roughly 1/3 of the attempts to introduce entomophages throughout the world are successful.  
[224-12131]

UDC 632.914.4

#### ASSESSING HARMFULNESS OF PLANT DISEASES

Moscow ZASHCHITA RASTENIY in Russian No 10, Oct 83 pp 38-39

ZAKHAROVA, T. I., senior scientific worker, All-Union Scientific Research Institute for Plant Protection

[Abstract] The author defines terms such as plant damage--a biological loss--and harvest loss--an economic loss--direct visible damage and indirect damage, and biological and economic thresholds that indicate economic effectiveness in use of pesticides and other means of controlling such losses. Graphic presentations illustrate degree and time of damage during a crop's life cycle, and yield-changes that result. As an example, the author presents study of phytophthora infection of potatoes, with estimates of total yield loss and starch loss in the potatoes that are harvested. Another example illustrates total economic effect of the presence of various types of wheat smut through formulas that take all damage factors into account.  
[224-12131]

#### SURVEY OF TESTS OF BIOLOGICALS

Moscow ZASHCHITA RASTENIY in Russian No 9, Sep 83 pp 30-32

STROYEVA, I. A., senior scientific collaborator, All-Union Scientific Research Institute for Plant Protection and KHRYANINA, R. A., senior agronomist, State Commission for Chemical Substances

[Abstract] This survey describes and notes applications for 15 different biologicals tested by the All-Union Scientific Research Institute for Plant Protection and Far Eastern, Belorussian and Ukrainian counterparts. Domestic Soviet bitoxybacillin is used against spider mites and Colorado beetles in protected plantings of eggplants and cucumbers, and on cotton in Tashkent Oblast. Variations in effectiveness support the need for further study. Virine compounds virine-GOS, virine-GYaP, virine-KSh, virine-KhS, virine-EKS and virine-ENS are being used against cutworms, codling moths, boll weevils, cabbage moths and silkworm moths in various Soviet republics, with some still undergoing tests and others approved for regular use. Tests of dendrobacillin-100 for controlling boll weevils are continuing. Lepidocide has been approved

for use against cabbage moths and cabbage and turnip butterflies in production tests in the Ukraine. Trichodermin is still being tested as a pesticide in cotton plantings; trichothetin has been adopted for use in apple orchards against apple scab and fruit rot. Phytolavin has been approved for use on spring wheat and soya plantings to prevent root and sprout diseases. Elkar, the only non-Soviet product cited in the survey, has been approved for use against the cotton moth. Tests of entobacterin for controlling leaf roller moths continue.

[222-12131]

UDC 632.4:633.18

#### LOSSES FROM RICE PIRICULARIOSIS

Moscow ZASHCHITA RASTENIY in Russian No 9, Sep 83 p 43

PODKIN, O. V. and SYCHEV, V. P. laboratory directors, All-Union Scientific Research Institute for Rice

[Abstract] Piriculariosis, a serious disease on rice plantations in the Ukraine, Krasnodarskiy and Primorskiy krais and Astrakhan Oblast, causes the greatest damage to nodal and panicle forms during August. The authors studied the course of infestations, and determined that chemical control methods became economically justified when infestations reached 10-11 imagoes per square meter, and damage from larvae to racemes reached 32-37%. Economic effects were calculated on the basis of supplemental harvest resulting from control and losses where control was not carried out. Fungicide use was judged profitable at very low levels, when 2% of plants in the leaf form were damaged, 0.4% of those in the nodal form and 0.04% of those in the panicle form were affected by piriculariosis.

[222-12131]

UDC 577.112.083:577.352.53

ISOLATION FROM BOVINE BRAIN OF PROTEIN WHICH BLOCKS VOLTAGE-DEPENDENT SODIUM CHANNELS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83  
(manuscript received 27 May 83) pp 744-747

MANYAKOV, V. F. and GOLOBOROD'KO, V. N., Institute of Physiology imeni  
A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] Details are provided on the isolation of a 15,000 dalton protein from bovine brain which reversibly blocked tetrodotoxin-sensitive sodium channels. The blocking effects of this cytoplasmic protein were followed on neuroblastomas and isolated mammalian neurons using the techniques of intracellular perfusion and potential fixation. In a concentration of ca.  $10^{-7}$  M this protein (designated M1) blocked the rapid sodium influx component, did not affect the slow component, and did not alter calcium permeability. The rapid onset of action of M1 on addition to the bath and the ease with which it could be removed by washing indicate that the protein is bound to the external part of the sodium channel. The physiological significance of this protein remains to be elucidated. Figures 4; references 6 (Western).  
[152-12172]

EMPIRICAL MODEL OF MICROALGAE GROWTH UNDER CONDITIONS OF INTERMITTENT LIGHTING

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 30, No 2, Mar-Apr 83  
(manuscript received 26 Apr 82) pp 324-331

BEL'YANIN, V. N., VOPILOVA, L. V. and SID'KO, F. Ya., Institute of Biophysics,  
Siberian Department, USSR Academy of Sciences, Krasnoyarsk

[Abstract] A model was developed representing relative growth rate ( $\mu$  hr<sup>-1</sup>) and productivity (P) of plant cells as a function of time parameters ( $\tau$  - time of light impulse and  $\tau_T$  - time of darkness). Experimental material was obtained in stationary growth of microalgae adapted to light-dependent cell growth. The data obtained were analyzed by a parametric equation for relative growth rate developed previously. After all coefficients sensitive to pulsed lighting were determined, analysis of the data obtained from irradiation of *Synechococcus elongatus* showed that the coefficient K was most sensitive to light cultivation of cells. It was shown that maximum productivity and highest relative growth rate occurred at  $\tau_T/\tau_s = 1$  and increased with average illumination of the culture  $\bar{E}_1$ . Based on the model results, it was concluded that optimal darkness time following the light pulse should change along with the duration of the pulse; then the relative photosynthesis rate would reach the rate observed under conditions of uninterrupted illumination. Data from the experimental model were in good agreement with that theoretically calculated. Figures 5; references 15: 6 Russian, 9 Western (2 by Russian authors).  
[203-7813]

## EPIDEMIOLOGY

UDC 616.61-002.151-036.17-036.8

### EARLY AND LATE SEQUELAE OF SEVERE HEMORRHAGIC FEVER WITH NEPHROTIC SYNDROME

Moscow KLINICHESKAYA MEDITSINA in Russian No 2, Feb 83  
(manuscript received 29 Mar 82) pp 62-66

KRIZHANOVSKIY, V. I., FIGURNOV, V. A., PIROGOV, A. B. and ZAVALOVSKAYA, L. I.,  
Blagoveshchensk Medical Institute

[Abstract] A long-term follow-up was conducted on the sequelae of severe hemorrhagic fever with nephrotic syndrome, involving 72 male and female patients ranging in age from 16 to 56 years. The results of a variety of function tests and clinical impressions demonstrated that sequelae can persist from a minimum of three months to at least five years. The most frequently encountered sequelae were diagnosed as the asthenoneurotic syndrome, lumbar pain, renal tubular insufficiency neutropenia, lymphocytosis, and hypoalbuminemia. In addition, 4.3% of the patients were seen to develop chronic pyelonephritis. Management of such patients involved their dispensation from heavy physical work, specific and general supportive therapy, and rest and recuperation at local health resorts in the Soviet Far East. Marked improvement was seen in 75.6% of the patients managed in this manner and, in general, most patients were certified as fit for work within 12 months. References 25: 23 Russian, 2 Western.  
[229-12172]

UDC 616.98:579.834.115]-036.1

### CLINICAL VARIANTS OF LEPTOSPIROSIS

Moscow KLINICHESKAYA MEDITSINA in Russian No 2, Feb 83  
(manuscript received 12 Apr 82) pp 89-93

UGRYUMOV, B. L., PLETNEV, V. M., VOVK, A. D., TAT'YANKO, N. V.,  
GORODETSKIY, M. M., YURKOVSKAYA, N. B., LERNARTOVICH, L. S., ZAKHARENKO, N. I.,  
POSTOVIT, N. B. and MARKOV, I. S., Kiev

[Abstract] A review is presented of the various clinical patterns that leptospirosis may follow, based on case histories of 208 male and female patients. Most of the patients (142) were 20 to 40 years old, with the majority of the cases occurring in summer; however, in recent years the incidence of

leptospirosis in the fall and winter has increased due to contact with infected rodents on farms and at home. The mean incubation period was 7-8 days, with some cases showing a febrile onset after 2-3 days. Generally, the cases under review could be classed into the following categories on the basis of organ and system involvement: hepatorenal, cardiovascular, pulmonary, meningeal, abdominal and gastrointestinal. References 6: 3 Russian, 3 Western.  
[229-12172]

UDC 616.98:579.881.13]-036.87

#### CASE OF RECURRENT Q FEVER

Moscow KLINICHESKAYA MEDITSINA in Russian No 2, Feb 83  
(manuscript received 22 Jul 82) pp 96-97

TOKAREVICH, N. K., UDALOVA, G. V. and AMOSENKOVA, N. I., Laboratory of Endemic Diseases, Leningrad Institute of Epidemiology and Microbiology imeni L. Pasteur; Municipal Infectious Diseases Hospital imeni S. P. Botkin

[Abstract] Presentation is made of the case of a 30 year old male patient hospitalized at the Municipal Infectious Diseases Hospital imeni S. P. Botkin on Dec 4, 1977 for Q fever. The patient was successfully treated with a standard regimen of antibiotics and discharged on Dec 31. The patient was again hospitalized on Feb 2, 1978 for Q fever on symptomatic grounds and serologically confirmed rise in anti-Coxiella antibodies. In addition, the causative agent was identified by immunofluorescent technique in a clot of the patient's blood and isolated from mice inoculated with the patient's blood. The patient was treated with tetracycline and discharged two weeks later. During the subsequent four-year follow-up there was no recurrence of Q fever. The case is of interest in view of the 50-day lapse after initial hospitalization and recurrence, and indicates that patients who have sustained Q fever should be closely monitored for some time after all clinical symptoms have abated. References 6: 3 Russian, 3 Western.  
[229-12172]

UDC 616.99-078+576.89.07]:614.3/.4:061.6

#### PARASITOLOGICAL EXAMINATION METHODS RECOMMENDED FOR SANITARY EPIDEMIOLOGICAL STATION LABORATORIES

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 2, Mar-Apr 83 (manuscript received 2 Feb 82) pp 44-48

SOLODOVNIKOV, YU. L., ASTAF'YEV, B. A., MAYOROVA, L. A., RUSAKOV, N. V. and DERKACH, YU. S., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] Methods recommended to sanitary epidemiological stations for parasitological investigations were selected on the basis of sensitivity, accuracy, reliability and ease of use. Flotation, the Kato thick smear method

and native smears are the best procedures in helminthologic oviscopic coprology. Macroscopic exams are also important. Perianal-rectal impressions with adhesive tapes are best for revealing pinworm or tapeworm infestation. Native, enriched fecal smears and smears stained with Lugol's solution are suitable for detecting intestinal protozoa, while peptic digestion of muscle tissue or serology should be used for trichinella larvae. Serological diagnosis is recommended for echinococcosis and alveolococcosis. The Berman unified method for fecal and urine examination is best for detecting nematodes. In blood analysis for tropical diseases, thick drop and thin smears treated with Romanov-Giemsa stain should be used for malaria, spirochetes and trypanosomes, while microcapillary methods and enriched smears are best for microfilaria. Membrane, paper or tissue filtration is important for the determination of parasites in environmental water. In soil analysis, preliminary loosening of the soil with a current of air, alkaline solution or electrical stirring, followed by flotation of parasite eggs with sodium nitrate solution, is recommended. Pinworm egg viability is determined using methylene blue stain in lactic acid solution with alkali hydroxides. Sanitary helminthological control requires analysis of dust, hand and object washings and fingernail scrapings. Compression methods and peptic digestion are used in fish trematode analysis. References 36: 34 Russian, 2 Western.

[156-12126]

UDC 615.285.7.015.4:576.895.771.095.6

#### EVALUATION OF BISAZIR AS MOSQUITO CHEMOSTERILANT

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 1, Jan-Feb 83 (manuscript received 1 Apr 82) pp 42-46

ZAKHAROVA, N. F., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] The sterilizing effect of bisazir, P, P-bis(1-aziridinyl)-N-methylphosphine thioamide, (Ent-61585, synthesized in the United States) was tested on *Aedes aegypti* L. and *Anopheles atroparvus* Van Tiel. Using *An. atroparvus*, optimum pupal sterility (close to 100%), was achieved via exposure to a 0.6% solution for 60-90 minutes or to a 1% solution for 45 minutes. For *A. aegypti*, the highest percent of nonviable eggs, 98.5%, was achieved using a 0.6% solution and 45 minutes exposure of the pupae. The effectiveness of Bisazir against *A. Aegypti* decreased when either dilution strength or exposure time were increased. In both types of mosquitoes, females were less susceptible than males. Prolonged exposure decreased egg production. Pupal mortality was 6-12% for *An. atroparvus* and 0-4% for *A. aegypti*. Bisazir is significantly more effective than thiophosphamide, permitting *An. atroparvus* exposure time to be five times shorter. While bisazir is also an effective sterilant for adult male mosquitoes, the needed dose increases mortality to unacceptable levels. References 9: 2 Russian, 7 Western.

[157-12126]

PROBLEMS IN EPIDEMIOLOGY AND EPIZOOTOLOGY OF TICK-BORNE ENCEPHALITIS  
(UNPUBLISHED MATERIAL FROM ARCHIVES OF V. N. BEKLEMISHEV)

Moscow MEDITSINSKAYA PARAZITOLOGIYA I PARAZITARNYYE BOLEZNI in Russian No 1,  
Jan-Feb 83 (manuscript received 7 Sep 81) pp 66-74

BABENKO, L. V.

[Abstract] Unpublished material from the archives of V. N. Beklemishev is presented. A diagram entitled "Epidemiology and Prophylaxis of Tick-Borne Encephalitis (Plan of Investigation)" was prepared from a 1958 report and covered needed studies in the virological prerequisites for the circulation of the tick-borne encephalitis virus in its foci, as well as its cycles in nature. A "Program for the Experimental Epidemiological Study of Foci of Tick-Borne Encephalitis" was written in 1954 and suggests investigation of insect and animal populations, prevalence of virus, and possibilities for and effects of eradicating *Ixodes persulcatus* with hexachlorocyclohexane (Lindane). A diagram describes the probability of an infected tick attaching to a man who enters a focus of tick-borne encephalitis in terms of tick and human activity and degree of tick infection. "Principles for Classifying Pseudofoci of Tick-Borne Encephalitis" is based on the degree of contact between the human population of the pseudofocus and the natural foci, intensity of the natural foci and population turnover. References 19 (Russian).  
[157-12126]

DIALYZED SPECIFIC TRANSFER FACTOR IN MICE IMMUNIZED WITH ATTENUATED LANGAT VIRUS FROM VIRUS COMPLEX OF TICK ENCEPHALITIS: FORMATION, ACTION AND QUANTITATIVE DETERMINATION

Bratislava ACTA VIROLOGICA in Russian Vol 26, No 6, Nov 82  
(manuscript received 15 Apr 82) pp 453-465

MAYER, V., GAJDOŠOVÁ, E., VALÁŠKOVÁ, M. GOMBOŠOVÁ, A. and ORAVEC, C.,  
Institute of Virology, Slovak Academy of Sciences; Joint Center for Virological Research; Clinic for Infectious and Parasitic Diseases, Medical School, Comenius University, Bratislava; and Institute of Experimental Oncology, Slovak Academy of Sciences, Bratislava

[Abstract] Intense study of the transfer factor in dialysates of lysated leucocytes has shown several immunization reactions of antigen-bound and antigen-free activity. Ambiguities in results led to the present study, in which Langat virus was titered in swine kidney cells before being administered to suckling "ICR" mice. The emission of  $^{51}\text{Cr}$  was then measured as a parameter of transfer. Preparation of dialyzed lysates of mouse spleen leucocytes, titration of antigen-specific transfer factor activity and measurements of interferon, protein and RNA content are outlined. Results include the formation of specific transfer factors in the treated mice and in spleen leucocytes, dynamics of transfer factor activity, activities of effector T lymphocytes in

flavirus groups as induced by dialyzed leucocyte lysates from the Langat-immunized mice, and the stimulating effects of the specific transfer factor on T "killer-lymphocytes". Other features were induction of interferon of the lysates, thermal inactivation of the transfer factor, and separation of fractions of the lysates using gel filtration. The ability to generate specific transfer cells was not clarified, and requires further research. Figures 4, references 16: 3 Russian, 13 Western.  
[230-12131]

SURFACE MORPHOLOGY OF MICE FIBROBLASTS INFECTED WITH RICKETTSIA  
TSUTSUGAMUSHI

Bratislava ACTA VIROLOGICA in Russian Vol 26, No 6, Nov 82  
(manuscript received 29 Apr 82) pp 506-511

TSURUHARA, T., URAKAMI, H. and TAMURA, A., Department of Microbiology, Niigata Pharmacological College, Niigata, Japan

[Abstract] Following research that described *Rickettsia rickettsii* and *R. prowazekii*, using an electron microscope, as morphologically similar to bacteria but smaller, the authors present morphological findings obtained with a scanning electron microscope throughout the life cycle of *R. tsutsugamushi* passed through chicken embryo yolk.sacs before being injected into L cells of mice. The scanning electron microscope showed little variation between initial and control cells given non-infected materials after 96 hours of laboratory cultivation. The cells infected with *Rickettsia* showed the presence of the pathogen within 30 minutes, and after 96 hours, *Rickettsia* of both spherical form with 0.5-0.7 mkm diameter, and bacillary forms 0.5-0.7 x 1.0-1.5 mkm were observed; most of the latter were perpendicular to the host surface. Further enlargement revealed a layer of fibers stained by ruthenium red, with a thickness of 25 nm, a three-layer cell membrane of 5-6 nm thickness, an outer 7-8 nm coating, and inner 2-2.5 nm layer, periplasmatic space of 15-20 nm and a three-layer cytoplasmatic membrane. The study showed that emerging *Rickettsia* are covered with a membrane from the host cell that prevents staining with ruthenium red, and that the external cell wall of *R. tsutsugamushi* is thicker than the internal wall. Figure 1; illustrations 10, references 20: 2 Russian, 18 Western.  
[230-12131]

SOME CLINICAL-EPIDEMIOLOGICAL ASPECTS OF BOTULISM IN MOLDAVIA (BASED ON DATA OF RECENT YEARS)

Kishinev ZDRAVOOKHRANENIYE in Russian No 5, Sep-Oct 83  
(manuscript received 10 Feb 83) pp 7-10

NEGRESKU, V. Ya., KALINOS, V. L., GABARETS, Ye. P. and GLADILIN, Yu. N.,  
Course in Infectious Diseases, Faculty for Advanced Training of Physicians,  
Kishinev Medical Institute

[Abstract] The relative infrequency of botulism has often led to late diagnosis and delayed initiation of treatment of the disease. Private canning of foods, and atypical courses of the disease have also made it difficult to diagnose. The authors relate their recent experience with 46 botulism patients who sought aid at MSSR infectious diseases hospitals and installations. Patients ranged from 7 to 61 yrs, mostly (41) adults; 28 were male, 18 female. There were 10 isolated cases and 12 group outbreaks. Thirty-three contracted the botulism from home preserves, the rest from commercial products. The canned foods were mushrooms, meat, fish, or vegetables. Diagnosis prior to hospital referral was frequently erroneous. Under controlled conditions the infectious toxic genesis of the disease was established by data on incubation time, fever, blood indices and isolation of the pathogen from body tissues. The late requests for medical assistance and the initial incorrect diagnosis point to the need for education of the population, and, also, of physicians in botulism diagnosis. Case histories are given. References: 5 Russian, 2 Western.  
[227-8586]

## FOOD TECHNOLOGY

### REGIONAL SELF-SUFFICIENCY IN FOODSTUFFS DISCUSSED

Moscow SOVETSKAYA ROSSIYA in Russian 25 Sep 83 p 3

[Article by V. Mikhaylov, correspondent of SOVETSKAYA ROSSIYA: "You Ask, Should We Bring In or Raise?"]

[Text] "In a speech at the June (1983) Plenum of the CPSU Central Committee, General Secretary of the CPSU Central Committee, Comrade Yu. V. Andropov stressed: 'It is particularly essential to set up uninterrupted delivery of high-grade foodstuffs to the public, in such a way as to achieve the maximum degree of self-sufficiency in this respect.' I should like to ask the editorial board to tell us more about what it means to achieve maximum self-sufficiency. [signed] V. A. Korenev, Moscow."

Our correspondent, V. Mikhaylov, asked N. E. SMETANIN, deputy chief of the Department of Agriculture and Procurement of the USSR Gosplan, to answer this reader's question.

First let me make one important comment. We sometimes forget that our diet has long since been in the normal range and even somewhat higher with regard to calorie content. It was possible to achieve this primarily through our own resources, there have been quite a few beneficial changes in rural areas and, at the present time, 27% of all capital investments are allocated there. For example, under the 10th Five-Year Plan, 34 billion rubles were spent on land reclamation, versus 7 billion in 1961-1965, and fertilizer production has more than tripled since 1965. There has been a drastic increase in delivery of machinery and equipment; other steps have also been taken to strengthen the economy of kolkhozes and sovkhozes.

As a result, agricultural production has increased in our country by 1.5 times in the last 15 years. Nevertheless, this is still not enough. Though it may be paradoxical it is a fact that the problem of food supply has become particularly acute at a time when the public began to overconsume. The fact of the matter is that, although we take in enough calories, the structure of the diet is still unsatisfactory. In our country, 140 kg bread is consumed per year per person, versus the recommended 110 kg, while 44-45 kg sugar is consumed, when 35 would have been enough. But the amounts of milk, meat and vegetables

are still insufficient, although their consumption is increasing. In 1965, there was, for example, 41 kg meat per person, and it was available at virtually all shops. At the present time, each of us consumes an average of 56-58 kg meat per year, but still the demand for it is not being met. What has changed since then? The following figures explain everything: in 1965, only 4% of the families had an income of over 100 rubles per person, whereas now they constitute more than 50% and each such family would like to have 88 kg meat per person, including children, as indicated by surveys.

It is not a simple matter to replace with the required proportion of calories presently taken in bread with more valuable proteins contained in meat and milk.

Bread and pork have the same caloric value, but to produce a kilogram of meat about 10 kg grain is required. As for overall expenditures, they are 15-20 times higher. That is the price for proteins that are more valuable in their biological properties. In order to make this qualitative advance, we need time and considerable funds. For the time being, however, we have to procure grain, meat, fruit and vegetables abroad to enrich our diet and improve it.

What will happen in the future? Of course, we shall always import some items, such as coffee, cocoa, spices and the like. There will be further development of interstate separation of labor, which also means barter within the limits of the socialist alliance. As for meat and grain, they are products in which we specialize and we should meet in the future the entire demands for them at the expense of our own production. Thereby we shall achieve maximum possible self-sufficiency and uninterrupted supply of high-grade foodstuffs to the public.

The Soviet people know from the Food Program just how and when this task will be fulfilled. Let me recall that, first of all, it is imperative to augment grain harvest from an average of 205 million tons under the 10th Five-Year Plan to 250-255 million tons under the 12th Five-Year Plan.

We already have enough grain for food, but we need to increase the share of sturdy and durum wheat in its overall balance. Thus, the grain increment will proceed mainly with regard to animal feed, and for this reason we must already think about how to use this increment more wisely and efficiently; for the time being, the share of grain in the diet of cattle is, for example, excessive, and this is not beneficial to cattle, rather it is detrimental. Without coarse, succulent and green fodder cattle productivity cannot be increased. Yet in our country, grasses grow well in virtually all areas, and we have more than 300 million hectares of natural meadows alone; this is an enormous asset and one of our principal reserves. I would even say that in the future our feed base will grow through the meadows. It is imperative to increase the share of leguminous plants--clover, lupine, alfalfa and peas--in pastures covered with fodder crops. As shown by worldwide experience, soybeans play an inestimable role in stockpiling protein: CEMA nations, for example, purchase them in large quantities annually.

Heretofore we have been discussing self-sufficiency on a national scale, but there is also a regional aspect to this problem. Today, there are a number of economic regions of our country where much less livestock products are produced

than could be produced. Of course, in areas where conditions exist for raising rice, tea or, for example, cotton, they should occupy the place of honor in crop rotations. However, experience shows that, along with increased harvesting of agricultural crops in which a given region specializes, skillful farmers are also finding ways to increase significantly the productivity of animal raising, all that is needed is to manifest a little more initiative, enterprise and to make fuller use of local resources.

Can it be considered permissible to settle for a situation where it often happens that people wait for delivery of fresh vegetables to rural dining rooms? A vegetable garden, and actually not even a garden, but an ancillary plot should exist for each kolkhoz and sovkhoz. And each should have its own cows, if it does not have a commercial dairy herd. It is not wise to purchase milk from neighbors. Even if it will cost a little more, it is not in vain that in olden days there was a saying: "A calf costs half a kopek abroad, but the transportation costs a ruble."

Nor can we consider it proper that many rural residents no longer keep cattle. In recent times, the situation has changed somewhat for the better, and finally, the number of livestock kept for personal use ceased to decrease since 1981. The public is growing considerably more pigs at the present time. The private plots presently yield 26% of all agricultural products, so that they deserve both attention and concern. Every possible encouragement must be given to those who strive to provide all the necessities for themselves; it is incongruous to live right next to farms and eat only what is available in the stores.

10,657

CSO: 1840/093

## NEW THERAPEUTIC FOOD ITEMS DEVELOPED IN KIEV

Kiev PRAVDA UKRAINY in Russian 14 Sep 83 p 4

[Article by Ya. Oleynichenko: "Tasty ... Medicines. Research and Discoveries"]

[Text] The scientists and specialists at the Kiev Technological Institute of the Food Industry (KTIPP) and Kiev Scientific Research Institute of Pediatrics, Obstetrics and Gynecology imeni Professor P. M. Buyko, Hero of the Soviet Union, have developed and introduced to practice several basically new products for therapeutic and preventive nutrition, for which author certificates have been issued by the State Committee for Inventions and Discoveries.

... I am tasting a viscous dark brown liquid, "cholesol." It resembles the taste of honey in a way.

"This is understandable," smiles V. S. Ivanov, senior scientific associate in the department of machinery and apparatus of KTIPP. "This product is based on a poly malt extract of sprouted wheat, oat and corn grain. It has high biological activity, contains various vitamins, enzymes, trace elements and amino acids."

We are conversing in one of the shops of the Kiev Industrial Nonalcoholic Beverage Association, rather than in an institute laboratory. This is where production of new therapeutic food items is organized after they were submitted to serious testing at medical institutions of Kiev, as well as Zhitomir, Chernigov and Cherkassy Oblasts.

"You have just tasted 'cholesol'," said A. A. Zakrevskiy, doctor of medical sciences, who is chief of the Nutrition Department of the Scientific Research Institute of Pediatrics, Obstetrics and Gynecology. "It has a general fortifying effect, improves resistance of the body to infections, increases gamma globulin content of blood, regulates metabolism and functions of digestive organs, and strengthens the nervous system."

But "cholesol" is merely one of the products in a new series. There will also be antihypoxin, which has been recommended in combined treatment of cardiovascular diseases and for the prevention of such diseases, hemosol, which is used for anemia, liposol, which regulates metabolic processes, nephrosol, for kidney diseases, nevrosol for diseases of the nervous system, and others.

What all these products have in common is a biologically active base, which consists of malt extracts of germinated gramineous and legumeneous crops. The breadth of their use is attributable to their constituents: the base and plant additives are changed, depending on their purpose.

The therapeutic value of germinating grain has long since drawn the attention of scientists all over the world. This product has amazing properties: while furnishing essential substances to the human body, it does not lead to undesirable complications, is instrumental in rejuvenating the body, which is particularly important under conditions of limited movement. Physicians are joking that while it was previously said to "eat for good health," now one says "eat but not to your detriment...." This is actually not even a joke. Not so long ago, upon returning from a resort, we noted with satisfaction that we had gained a few kilograms and now we anxiously watch whether we succeeded in losing weight. This is due to the excessive intake of carbohydrates and fats and insufficient intake of a number of vitamins and minerals. There is particular impairment of metabolism during sedentary work, which often leads to numerous "popular" diseases.

As far back as 15 years ago, F. F. Yakubovich, who then worked as chief engineer at the Kiev Experimental Malt Extract Plant, undertook a purposeful search for therapeutic foods based on malt.

For many years experiments were conducted, tests performed and technology was refined. And now, the joint research of technologists and medical men yielded an excellent result, development of products having no analogues elsewhere in the world. Firms in Japan, France, Belgium, Spain and several other countries have already shown interest in them.

Professor Ye. M. Luk'yanova, corresponding member of the USSR Academy of Medical Sciences and director of the Scientific Research Institute of Pediatrics, Obstetrics and Gynecology, tells us: "Use of the new therapeutic food items in the combined therapy of a number of diseases, especially among pregnant women and children, enhances its effects significantly." The team of our scientists headed by Professor Ye. P. Samborskaya and A. A. Zakrevskiy, doctor of medical sciences, who are involved in testing new items in clinical practice, arrived at another rather important conclusion: the items based on poly malt have no side effects and they are safe for everyone.

"This opens up vast possibilities for using new items as purely food products," said Professor I. S. Gulyy, rector of KTIPP. "We have done considerable work for their industrial assimilation. Not only specialized nutrition for children but a wide assortment of confectionery goods and cold beverages can be produced on their basis. Professor V. A. Anistratenko, Docent G. S. Demchuk, senior scientific associate V. S. Ivanov and other associates at our institute, with whose participation a new direction was initiated in therapeutic nutrition, have taken into consideration the very broad possibilities of the raw materials base for production of items and they have refined a rational production technology."

At first, of course, the new items will appear in medical institutions. Then in pharmacies. The next step will be the trade network.

A.V. Rakhanskiy, deputy minister of the Ukrainian Ministry of the Food Industry, tells us: "Considering the importance of the innovation, a shop was equipped at the Kiev Experimental Malt Extract Plant for output of new therapeutic food items. It will put out the first product within literally a few days. Then production of foods based on poly malt will be expanded to many food enterprises of this republic."

10,657

CSO: 1840/093

UDC 547.963.32.07:577.113.6

SYNTHESIS OF OLIGONUCLEOTIDES SUITABLE FOR RECOMBINANT DNA STUDIES BY  
N-METHYLLIMIDAZOLIDE PHOSPHOTRIESTER METHOD

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 10, Oct 83  
(manuscript received 12 Apr 83) pp 1367-1381

YEFIMOV, V. A., BURYAKOVA, A. A., REVERDATTO, S. V. and CHAKHMAKHCHEVA, O. G.,  
Institute of Bioorganic Chemistry imeni M. I. Shemyakin, USSR Academy of  
Sciences, Moscow

[Abstract] Details are presented on the use of the N-methylimidazolidine phosphotriester method for the synthesis of 24 oligonucleotides for use in recombinant DNA research as specific primers, molecular probes, linking molecules and adaptors for cloning and expression of DNA fragments. This approach, whether carried out in solution or as a solid phase set-up employing polystyrene, pore glass, or HPLC-grade silica gel, utilizes arylsulfochlorides for the formation of internucleotide phosphotriester bond in such solvents as pyridine, dioxane, acetonitrile, methylene chloride, chloroform, nitromethane, etc., and offers the advantage of speed over traditional methods. Additional improvements have been made in the method for the removal of the 5'-dimethoxytrityl blocking group from the oligomers, deblocking of the final oligonucleotides, coupling of the first nucleotide to the solid phase support, and isolation of the nucleotides in wet synthesis. Figures 4; references 26: 5 Russian, 21 Western.  
[183-12172]

UDC 547.963.32.07:577.217.3

SYNTHESIS AND EXPRESSION OF DNA FRAGMENT CODING FOR ANTIGENIC DETERMINANT OF  
HBsAg

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 10, Oct 83  
(manuscript received 4 Apr 83) pp 1388-1394

SMIRNOV, V. D., SERGIYENKO, O. V., SKRIPKIN, Ye. A., DUBICHEV, A. G., LUNIN, V. G.,  
GRIGOR'YEV, V. G., TIKHONENKO, T. I. and KARELIN\*, T. I., Institute of Virology  
imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow; \*Moscow Veter-  
inary Academy imeni K. I. Skryabin, USSR Ministry of Agriculture

[Abstract] A standard chemical and enzymatic approach was utilized for the synthesis of the polynucleotide sequence corresponding to the 93-109 amino acid sequence of HBsAg. Subsequently, recombinant technology was used to insert

this polynucleotide sequence into plasmid pBR325 DNA between EcoRI and BamHI sites. The resultant hybrid plasmid was designated pHS12 and used for the transformation of E. coli HB101 cells. Expression of pHS12 DNA in a cell-free E. coli system with coupled transcription and translation resulted in the formation of a chimeric polypeptide corresponding to the 93-109 amino acid segment of HBsAg which had a molecular weight of ca. 16500 daltons. The immunological specificity of this peptide remains to be determined as well as its putative role as a vaccine for hepatitis B virus. Figures 3; references 24: 3 Russian, 21 Western.  
[183-12172]

UDC 577.1

#### PARTICIPATION OF SPHINGOMYELIN IN FORMATION OF DNA BOND WITH NUCLEAR MATRIX IN REPLICATION PROCESS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 1, Nov 83.  
(manuscript received 19 Apr 83) pp 231-234

ALESENKO, A. V., KRASIL'NIKOV, V. A. and BOYKOV, P. Ya., Institute of Chemical Physics, USSR Academy of Sciences, Moscow (Presented by academician N. M. Emanuel 19 Apr 83)

[Abstract] Change of composition of phospholipids in the nuclear matrix at the moment of intense DNA synthesis in regenerating liver cells and the capacity of sphingomyelinase to split off newly synthesized DNA from the nuclear matrix are described and discussed. Regenerating rat liver was used as a model of DNA synthesis. The sphingomyelin level in the nuclear matrix of normal liver is 50 percent, exceeding its relative level in the whole nucleus more than 10-fold. Processing the nuclear matrix with sphingomyelinase broke down 90 percent of the sphingomyelin. Destruction of sphingomyelin in the nuclear matrix led to entrance of nearly 80 percent of newly-synthesized DNA into the supernatant. Absence in the sphingomyelinase of admixtures of nuclease and protease indicates that the breakdown of the complex of DNA with the nuclear matrix is due to degradation of the sphingomyelin. Processing the nuclear matrix with sphingomyelinase caused no qualitative changes of composition of the proteins. It was assumed that the sphingomyelin is bound with DNA via protein. The high increase of sphingomyelin in the nuclear matrix at the time of DNA synthesis may indicate its possible role in the replication process. It is assumed that, in points in which are formed complexes of sphingomyelin with non-histone proteins, there occurs attachment of the DNA to the nuclear matrix. The presence of sphingomyelin in these points promotes destabilization of the DNA structure which facilitates unwinding of the double spiral by unwinding proteins before replication branching. The procedure of the increase of sphingomyelin in the nuclear matrix is unknown but its increase correlates with DNA synthesis and it participates in formation of a firm bond with this intranuclear structure in the replication process. Figure 1; references 12: 2 Russian, 10 Western.  
[150-2791]

## HUMAN FACTORS

### FATIGUE...UNDER A MICROSCOPE

Moscow MEDITSINSKAYA GAZETA in Russian 24 Aug 83 p 4

[Article by V. Kalita, Khar'kov]

[Text] "Would you like to know whether or not you are tired?" Coworkers of the Department of Genetics and Cytology of Khar'kov University asked me this question. Having lightly scraped mucous membrane from my mouth and having examined it under a microscope, specialists stated that even though it was the middle of a work day, my body was far from reaching the peak of tiredness.

This is how I experienced the method of evaluation of the body's condition with respect to energetic potential of live cells of the epithelium, which was worked out by university scientists and specialists of the Khar'kov Scientific Research Institute of Labor Hygiene and Occupational Diseases.

A test of the new, very original method of evaluating the body's condition, in which I participated, was conducted by scientists on computer-center operators at the peak of a work day. "Won't your experiment be held up when people have to perform urgent tasks?" worried electronic-computer engineering specialists. But they were reassured: No, for this, hours are not needed as usual, but it is a matter of seconds. All they took from the operators, as in my case, was a scraping from the mucous membrane inside their mouths. Then the researchers, having gone into an adjoining room reserved for them, checked their microscopes. And soon they announced that the conditions of the examined bodies were satisfactory, with none fatigued.

A live cell, a microscope and...tiredness. What kind of connection could there be between them?

Concentrated attention, and the sedentary nature of work, subject our bodies to an unusual psychological attack--quiet, unnoticed. Either early or late fatigue sets in, interest in the executed operation fades away and work efficiency and performance is reduced. This is when it is important to stop this undesirable process in time and to create a regime of work and rest for a person in such a way that the influence of fatigue will be minimal.

Physiologists and psychologists usually employ two groups of phenomena to determine the degree of fatigue: on one hand, the change of work efficiency, and on the other--changes in different systems and organs which accompany the

development of fatigue. However, such methods are time consuming and imperfect. But wouldn't it be impossible to diagnose the onset of the "quiet attack" with an account of biological changes in a person's cells?

"We have long been attracted," related Professor V. G. Shakhbazov, head of the university Department of Genetics and Cytology, "by the idea of creating an integral indicator of the condition of fatigue which would reflect deep biological changes in cells of a working person. We used the electrophoretic mobility of epithelial nuclei from the mouth cavity. The higher this indicator, the more intensively the cell works and the more proteins and other necessary compounds are produced. Then there is also intensive metabolism. But during fatigue, it is as if this microscopic accumulator discharges, and the cells cease working at full strength.

"An instrument has also been invented in our department which records the parameters of the activity of a working person's body. It is possible to discover at what moment fatigue sets in, which factors affect this process which is hidden from outside observation, to pinpoint the degree of work intensity, to regulate the regime of work and rest of the worker or specialist, to investigate work physiology and to singlemindedly control the person's body, not allowing fatigue to pass into exhaustion."

"Briefly said," interjected A. A. Kononenko, department head of the Khar'kov Scientific Research Institute of Labor Hygiene and Occupational Diseases and candidate of medical sciences, "we are presented with the possibility of switching from scientific organization of work to scientific organization of rest. Data of our combined research form the basis of special developments. Some of them have already been introduced, in particular, in the computer center of Khar'kov Oblast Statistical Administration. As a result of rational work rotation and methods of decreasing psychological-emotional loads, and industrial gymnastics, the operators' work productivity has risen markedly. We also intend to use our method for standardizing work in machine construction and other sectors of the national economy. This work enables us to further our understanding of cellular nuclei bioenergetics, to determine the influence of different external and internal factors on the energetic potential of live body cells, and, consequently, to aid in research on a series of important problems of physiologists, gerontologists, geneticists and cytologists."

The new method may be used not only in the industrial process, but also for evaluating fatigue of athletes, during training of pilots and astronauts and in other cases when it is necessary to evaluate the effect of extreme loads on a person.

12473  
CSO: 1840/216

EFFECTS OF LOW INTENSITY LASER IRRADIATION ON SURVIVING HUMAN TISSUES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83  
(manuscript received 17 May 83) pp 734-737

BEREZIN, Yu. D., PROCHUKHANOV, R. A., ROSTOVTSEVA, T. I. and SAMSONOVA, I. Ye.,  
First Leningrad Medical Institute imeni I. P. Pavlov; State Optical Institute  
imeni S. I. Vavilov, Leningrad

[Abstract] Human myocardium obtained within an hour of death was employed in studies on the consequences of exposure to low intensity laser irradiation. The myocardial specimens were exposed to helium-neon LG-38 red laser (630 nm emission) with an intensity of  $0.8 \text{ J/cm}^2$  at the target site for comparison with the effects resulting from an equivalent irradiation from a halogen lamp (KGM-24-100) with appropriate filters to give an emission of equivalent energy at 630 nm. Cytospectrophotometric evaluation of the histochemical data showed that laser irradiation leads to elevation of DNA concentration and potentiation of the aerobic and anaerobic phases of glycolysis in the mitochondria and the hyaloplasm within 5 min of exposure. The lysosomes were essentially unaffected as evident by minimal changes in acid esterase activity. Red light showed different metabolic dynamics: marked elevation of DNA concentration with activation of anaerobic glycolysis and increased acid esterase activity in conjunction with depressed aerobic glycolysis. After 60 min the differences were still apparent but the staining was less intense than in unirradiated control specimens. It appears that the monochromatic factor in laser irradiation may account for synchronization of the metabolic parameters under investigation. Figures 2; references 6 (Russian).  
[152-12172]

SENSITIZATION OF PHOTOCHEMICAL CHLOROPHYLL FORMATION FROM PROTOCHLOROPHYLL AND CHLOROPHYLLIDE ABSORBING IN THE LONG WAVELENGTH REGION IN LASER IRRADIATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83  
(manuscript received 20 May 83) pp 737-740

IGNATOV, N. V., BELYAYEVA, O. B. and LITVIN, F. F., Moscow State University  
imeni M. V. Lomonosov

[Abstract] Studies on illumination of etiolated leaves have established that chlorophyll is formed by the phototransformation of protochlorophyll(ide), which has an absorption maximum at 650 nm (P650). Such studies have also

revealed the existence of a series of protochlorophylls with absorption in the longer region (660-710 nm). Stimulation of the latter protochlorophyll(ide) molecules by ruby laser led to formation of chlorophyll and the demonstration that protochlorophyll absorbing at 697 nm (P697) was the donor of energy sensitizing P650. Energy transfer from P697 to P650 was similar in efficiency to the transfer of energy from chlorophyllide to P650. These observations indicate that P697 is a constituent of the photoactive complex and is energetically bound to P650. The P697 molecules may be involved in the formation of photoactive aggregates of chlorophyll and pheophytin in active photosynthetic sites. Figures 2; references 5: 1 Byelorussian, 4 Russian. [152-12172]

UDC 615.849.19+617.3

#### LASER TREATMENT OF INFECTED WOUNDS, TROPHIC ULCERS AND SOME SEQUELAE OF FRACTURES OF EXTREMITIES

Moscow ORTOPEDIYA TRAUMATOLOGIYA I PROTEZIROVANIYA in Russian No 4, Apr 83 (manuscript received 1 Mar 82) pp 46-51

BELYAKOV, A. A., docent, KAPITANSKIY, I. S., LABZINA, L. Ya. and ATYANINA, T. F., Traumatology, Orthopedics and Field Surgery Course, Medical Faculty, Mordovian University imeni N. P. Ogarev, Saransk

[Abstract] The LG-31 laser and the LG-38 laser were used to treat 184 patients for conditions including infected wounds after osteosynthesis of the tibia, trophic ulcers of the tibia, arthrosis deformans, humeroscapular periarthrititis, post amputation pain, amputation of the hip, amputation of the tibia. The effectiveness of the laser treatment in combined therapy was assessed by clinical observation, x-ray pictures, study of hemodynamics and biochemical, bacteriological, immunological and cytological studies. The laser treatment healed wounds 12 to 15 days sooner than conventional treatment. Ulcers healed completely in 33 cases with treatment time reduced by 25-30 days in comparison with conventional treatment. Four or five treatments improved the microflora picture; pain from humeroscapular periarthrititis and arthrosis deformans stopped after 6 or 7 treatments, post-amputation pain disappeared after 20 to 25 treatments and mobility improved. Some changes in blood protein and enzyme levels were seen. References 5 (Russian). [160-2791]

STIMULATION OF WOUND HEALING BY LOW INTENSITY LASERS

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 3, Mar 83  
(manuscript received 12 May 82) pp 54-57

LOBANOV, V. V., Chair of First In-Hospital Surgery, Chair of Pathologic Anatomy,  
Central Scientific Research Laboratory, Minsk Medical Institute

[Abstract] Studies were conducted on the effectiveness of low intensity laser-irradiation on the healing of experimental wounds in rats infected with golden staphylococcus. Histological evaluation of the affected sites demonstrated that daily laser treatment (6328 Å, 7.5 mW, helium-neon laser LG-75) for a total of 20 sessions increased the rate of wound healing 1.5-fold. This was largely due to enhanced granulation favored by an increase in collagen synthesis and vascularization. In addition, the intensity of the laser employed had no adverse side effects on the rats in terms of blood chemistries or the general condition of the animals. Figures 7; references 5 (Russian).  
[202-12172]

UDC 615.849.19:577

NEW DATA ON ANIMAL CELL PHOTSENSITIVITY AND MECHANISM OF LASER BIOSTIMULATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 1, Nov 83  
(manuscript received 21 Apr 83) pp 224-227

GAMALEYA, N. F., SHISHKO, Ye. D. and YANISH, Yu. V., Institute of Problems of Oncology imeni R. Ye. Kovetskiy, UkSSR Academy of Sciences, Kiev (Presented by academician P. G. Kostyuk 21 Apr 83

[Abstract] The existence of a special photoregulatory system in animal cells similar to such systems in plants and bacteria has been proposed. If this is true, the biostimulating action of a helium-neon laser may be due to the simple coincidence of its spectral characteristics with the region of absorption of components of this system. This proposal was confirmed experimentally and a previously unknown photoinduction reaction of the cells was described. There was shown for the first time the capacity of animal cells of different systematic and histological identity to react to monochromatic light of very low "regulatory" intensity by change of state of the cytomembrane which is accompanied by functional activity of the cell and emergence from them of a growth-stimulating DNA factor. It was assumed that this reaction is related to processes of photoregulation in man and animal and is mediated by a membrane-bound light acceptor of the porphyrin type. Its detection provides a rational basis for therapeutic use of a helium-neon laser. Figures 2; references 14: 11 Russian, 3 Western.  
[150-2791]

EFFECT OF HELIUM-NEON LASER ON CELLULAR ULTRASTRUCTURE AND PROLIFERATION OF  
MUCOUS MEMBRANE OF DUODENAL EPITHELIUM

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 95  
No 3, Mar 83 (manuscript received 23 Jul 82) pp 95-98

BAYBEKOV, I. M. and MUSAYEV, E., Department of Pathological Anatomy, Tashkent  
Branch of the All-Union Scientific Center of Surgery, USSR Academy of Medical  
Sciences

[Abstract] The anterior wall of the intestines of white male Wistar rats, 120-130 g, was exposed to a LG51-I helium-neon laser, 1.3-5 min, wave length 0.63 mcm, 8mW, irradiated area 3 mm. Radiation energy density for 1 min was  $6.78 \text{ J/cm}^2$ , for 3 min  $20.34 \text{ J/cm}^2$  and for 5 min  $33.9 \text{ J/cm}^2$ . Prior to irradiation, labelled thymidine was administered ip. to provide radioautograph recording of cell changes. Ultrastructural changes were induced, by the radiation, in the enterocytes and connective tissues of the duodenum membrane and these changes increased with the increasing magnitude of the total power of the laser action. The radiation caused substantial increase in proliferation activity of cells of the crypt. The radioautographic studies demonstrated increasing inclusion of the labelled thymidine into epitheliocytes of the crypt. Laser effects on epitheliocytes are graphically illustrated. Figures 2; references 7 (Russian) [216-8586]

## MEDICINE

### BRIEFS

BURN TREATMENT--Associates of the Georgian SSR Burn Center together with colleagues from the Pathological Physiology Department of the Institute of Medical Radiology of the USSR Academy of Medical Sciences, in the city of Obninsk, developed a new complex of pharmacological medicines for treatment of burn sickness. We asked Docent Besik Iashvili, manager of the Georgian SSR Burn Center and head specialist of the Georgian SSR Ministry of Health, to tell us about the new complex of medicines. If healing of the wound is delayed, so-called secondary gangrene of the tissue sets in, and then, far from the affected part, a burn sickness develops which produces complications on the part of other organs of the human body--the gall bladder, intestines, stomach, etc. Here the proposed complex of pharmacological medicines, which in time can prevent the development of this sickness, provides help. What are the components of this complex of medicines? They are trental, heparin, phytin, nicotinic acid and many other preparations, which in the complex are a reliable shield against the development of burn sickness. They, speaking figuratively, even at the beginning of the sickness, permit it to be taken into the "blister" and do not permit further development. With a burn, for example, the blood coagulation function is disturbed; that is, the blood stream slows down. Therefore, trental, a universal anticoagulant possessing a vascular dilating effect, is included in the complex. Phytin stimulates healing of the wound and heparin and nicotinic acid show a favorable action on the condition of the patient. Our colleagues from Obninsk also obtained positive results when they introduced the complex of medicines into practice. [By Irina Tvauri] [Text] [Tbilisi ZARYA VOSTOKA in Russian 11 Dec 83 p 4] 12410

CSO: 1840/213

UDC 611-01+611-018:371.3(47+57)

ROLE OF THE MILITARY MEDICAL ACADEMY IMENI S. M. KIROV IN TRAINING HIGHLY-QUALIFIED ANATOMISTS AND HISTOLOGISTS OF USSR

Leningrad ARKHIV ANATOMII GISTOLOGII I EMBRIOLOGII in Russian Vol 34, No 3, Mar 83 pp 90-96

DYSKIN, Ye. A. and KLISHOV, A. A., Chair of Normal Anatomy (Head, Professor Ye. A. Dyskin) and Chair of Histology and Embryology (Director, Professor A. A. Klishov), Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] This article is a review of contributions to education of the title physicians by the Military Medical Academy. It is first briefly noted that the traditions of that institution can be traced back almost 200 years, albeit slow-moving under the czars; however, since 1917, training has been vital and progressive and the successful Soviet educators are cited by name. This account of the training of anatomists and histologists at the academy since the beginning of the Soviet regime emphasizes the role of individuals with brief descriptions of their qualifications and achievements. Some information concerning change of training methods and procedures is presented. Many graduates of the MMA have continued their work at institutions throughout the USSR, among others the Kuybyshev Medical Institute and the Leningrad Sanitary-Hygiene Medical Institute.

[158-2791]

UDC 612.826-831.4

EFFECT OF SLEEP DEPRIVATION ON EPILEPTIFORM ACTIVITY

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 29, No 6, Nov-Dec 83 (manuscript received 24 Oct. 82) pp 710-715

KORIDZE, M. G., KAVKASIDZE, M. G., LORTKIPANIDZE, N. D. and MAYSURADZE, L. M., Institute of Physiology imeni I. S. Beritashvili, GSSR Academy of Sciences, Tbilisi

[Abstract] The effect of generalized convulsions on the wakefulness-sleep cycle of paradoxical sleep-deprived cats was studied, as was the influence of sleep deprivation on the threshold for an isolated epileptiform discharge in the EEG. Chronically implanted electrodes registered the electrical activity of the neocortex, the dorsal hippocampus and the oculomotor muscle. Generalized convulsions were found to delay sleep onset by one and half hours and to almost

completely eliminate paradoxical sleep. Slow wave sleep was also decreased. After 48 hours of paradoxical sleep deprivation, the threshold for an isolated epileptiform discharge in the EEG fell slightly during wakefulness and both sleep stages. Twenty-four hours later the threshold had returned to normal during wakefulness and paradoxical sleep, but was further depressed during slow-wave sleep. Total sleep deprivation elicited substantially greater threshold decreases during both sleep stages, while an increase in the threshold was observed after 24 hours. The results indicate that generalized convulsions elicited by stimulation of the neocortex suppress the paradoxical sleep rebound usually observed in the postdeprivation period. Sleep deprivation increases the excitability of the central nervous system, as seen in the lowering of the epileptiform discharge threshold. Figures 3; references 22: 4 Russian, 18 Western.  
[155-12126]

UDC 612.223.1:546.291]:612.261

# CHANGES IN PULMONARY AIR-BLOOD BARRIER UNDER CONDITIONS OF EXPOSURE TO HELIUM-OXYGEN MIXTURE RESPIRATION

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 95, No 4, Apr 83 (manuscript received 16 Aug 82) pp 107-110

ROZOVA, Ye. V., KOVALENKO, T. N. and SEREDENKO, M. M., Institute of Physiology imeni A. A. Bogomolets, UkSSR Academy of Sciences, Kiev

[Abstract] The goal of the present study was to investigate the effect of helium-oxygen gaseous mixtures, with varying  $O_2$  content, on the ultrastructure and morphometric characteristics of pulmonary air-blood barrier (ABB). The experiments were done on two groups of white rats aged 2 weeks and 10-14 months, exposed to He- $O_2$  mixtures containing 11, 21 and 40%  $O_2$  for 30 minutes per experiment. The experimental data showed that average arithmetic thickness of ABB increased slightly in the experimental group; average harmonic thickness increased considerably. An assumption was expressed that helium showed a direct effect on pulmonary ABB which was practically independent of the  $O_2$  concentration in the gaseous mixture inhaled, or of the age of the animals. On the basis of electron-microscopic data, it could be assumed that the structure most sensitive to the action of ABB was the capillary endothelium. Figures 3; references 12: 5 Russian (1 by Western author), 7 Western.  
[147-7813]

## MICROBIOLOGY

### MICROALGAE PRODUCED IN PHOTOREACTOR

Moscow MOSKOVSKAYA PRAVDA in Russian 12 Nov 83 p 3

[Article]

[Text] Unique new apparatuses for growing microalgae have been developed in the laboratories of the All-Union Biotechnology Scientific-Research Institute. A photoreactor--that is the name for an apparatus in which unusual plantations can be created. Various types of microalgae, including chlorella, are grown in them. This remarkable culture possesses a biomass that is rich in proteins. The apparatuses are named photoreactors because photosynthesis takes place in them under the rays of the sun or artificial light, forming valuable natural substances. Microalgae have the ability to make the fullest use of solar energy. In terms of photosynthesis they are vastly superior to such familiar farm crops as soybeans. Chlorella is especially well-known among microplants. Chlorella's biomass is an excellent supplement to feed given to livestock, poultry, and even fish, and the basis for nutritive media in bacteriological processes. This is why the artificial growing of such valuable protein additives is so promising. Now many countries are focusing special attention on the creation of profitable operations based on microbiological processes to produce protein and biologically active substances for the livestock food base. V. L. Korbut, candidate of technical sciences and a section director in the institute, explains various structures of the photoreactors. Before us is a unit resembling a silk cocoon in shape. Transparent polymer tubes form a spiral. This principle makes it possible to make the fullest possible use of the energy from a light source placed within the "cocoon." In another component of the apparatus we see tubular channels placed within. In the photoreactors, Moscow researchers are studying the growth and behavior of algae exposed to light energy. "It is most advisable," says V. L. Korbut, "to use glass tubes as the main components of the photoreactors. They are chemically inert and do not age under solar radiation. Such units are very convenient to use." These solar "reactors" are already on the job. This year a unit very similar to an industrial model was installed on Tashkent Oblast's Rassvet Sovkhoz. It has a useful volume of 20 cubic meters of chlorella suspension. The apparatus can produce dozens of kilograms of equivalent dry substance per day. As nutrient medium for the chlorella it is possible to use wastes from many types of production or traditional farm fertilizers. A unit installed in a hydrolysis plant in Andizhan has received high marks, and units are being installed in Turkmenia. The production of microalgae has another advantage as well. It can be organized on land that is unsuitable for raising traditional farm crops. Everything indicates that the raising and processing of microalgae will become a new branch in the production of protein products.

## REMARKABLE MICROBES

Moscow SEL'SKOYE KHOZYAYSTVO ROSSII in Russian No 10, Oct 83, p 44

RYNDIN, V.

[Abstract] A reporter at the Exhibition of Achievements of the National Economy of the USSR notes new advances and future potential utilization of microbiological agents. Production of yeasts, proteins, vitamins, antibiotics and aminoacids is approaching an industrial scale. The most interesting aspect of this new revolution is that the microbes feed on simple, usually discarded, organic matter. Special attention must be given to the growth and maintenance of these microorganisms. Another application of these novel agents is in the area of soil fertilization. Figure 1.  
[185-7813]

UDC 579.842.14:579.55:615.33]:579.61:616.9-036.2

## EFFECT OF CONJUGATIVE R-PLASMIDS ON VIRULENCE OF ANTIBIOTIC-SENSITIVE STRAINS OF SALMONELLA AND THEIR STREPTOMYCIN-RESISTANT MUTANTS

Moscow ANTIBIOTIKI in Russian Vol 28, No 9, Sep 83  
(manuscript received 21 Mar 83) pp 671-675

GRIDNEV, V. A. and LIVKINA, Ye. G., Khabarovsk Scientific Research Institute of Epidemiology and Microbiology

[Abstract] The effect of conjugative R-plasmids of various genetic structure on the virulence of antibiotic-sensitive strains of salmonella, and their streptomycin-resistant mutants of *S. typhimurium*, *S. paratyphi* B and *S. kottbus*, was studied in experiments on white mongrel mice (14 to 16 g) with use of eight R-plasmids. Virulence of the strains of salmonella for the white mice showed was lower in streptomycin-resistant mutants *S. typhimurium* and *S. paratyphi* B while no significant difference in degree of pathogenicity was noted for *S. kottbus*. Determination of  $\lg LD_{50}$  of the transconjugate showed that the conjugative R-plasmids may both increase and decrease the virulence of initial cultures of the causative agent for white mice. Identical R-plasmids changed the virulence of antibiotic-resistant and streptomycin-resistant cultures, frequently in opposite directions, thus expanding the limits of changes of

pathogenicity of the *Salmonella* serovars. Significant changes involving both increase and decrease of virulence of the antibiotic-sensitive strains of *Salmonella* occurred in 7 of 8 of the conjugative R-plasmids studied. The study showed that standard and wild conjugative R-plasmids may change the properties of antibiotic-sensitive cultures *S. typhimurium*, *S. paratyphi* B and *S. kottbus* as well as their streptomycin-resistant mutants. Figure 1; references 18: 16 Russian, 2 Western.  
[153-2791]

UDC 616.98:579.842.14]-02:615.276.3]-092.9

#### EFFECTS OF INDOMETHACIN IN EXPERIMENTAL SALMONELLAL ENDOTOXEMIA

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 55, No 11, Nov 83  
(manuscript received 17 Jan 83) pp 114-117

TUR'YANOV, M. Kh. and PAL'TSEV, M. A., Chair of Infectious Diseases, Sanitary-Hygienic Faculty, and Chair of Pathologic Anatomy, First Therapeutic and Sanitary-Hygienic Faculties, First Moscow Medical Institute imeni I. M. Sechenov

[Abstract] In view of the fact that the anti-inflammatory properties of indomethacin are predicated on inhibition of prostaglandin synthesis and salmonellal endotoxin has been shown to promote prostaglandin synthesis, the effects of indomethacin on renal and intestinal changes in salmonellal endotoxemia were investigated in chinchilla rabbits. Rabbits injected intravenously with the endotoxin (2 mg/kg) developed typical ultrastructural changes in the wall of the small intestine (vasodilatation, lymphocytic infiltrates, etc.) and in the renal cortex and medulla (decrease of lipid granules in the interstitial cells, accumulation of granules in the juxtaglomerular apparatus, etc.). Pre- or post-treatment of the animals with indomethacin (10 mg/kg) alleviated the clinical symptomatology of typical endotoxemia and diminished the severity of the ultrastructural changes seen in the small intestine and the kidney. The effectiveness of indomethacin in diminishing and reversing the physiological effects of *Salmonella typhimurium* endotoxin were ascribed to its effects on prostaglandin metabolism. Figures 6; references 6: 3 Russian, 3 Western.  
[219-12172]

STUDY OF BIOLOGICAL PROPERTIES OF RECOMBINANTS OF HUMAN FLU VIRUS AND POULTRY  
FEVER VIRUS WITH SPECIFIC GENOME COMPOSITION

Bratislava ACTA VIROLOGICA in Russian Vol 26, No 6, Nov 82  
(manuscript originally received 27 Jan 82, in final form 5 May 82) pp 432-437

GINZBURG, V. P., MARKUSHIN, S. G. and GHENDON, Yu. Z., Moscow Scientific Research  
Institute for Virus Preparations, USSR Ministry of Health

[Abstract] Study of recombinant genomes in recent years has made it possible to determine the genes that code specific proteins and reveal the correlation between biological properties of viruses and specific genes in their make-up. The present study reports on temperature-sensitive mutants of the poultry fever virus and human viruses, and includes description of certain biological features of recombinants that have been inherited from the poultry fever virus, while others have come from the human flu virus. The poultry fever virus strain was Weybridge H7N7, the human virus A/Krasnodar/101/59 (H2N2). Analysis was done by infixing the recombinants being studied in a culture of chicken embryo fibroblasts along with parent strains (100 EID<sub>50</sub>/cell), and incubating them

in the presence of 100 mcg/ml cycloheximide at 36°C for 60 minutes. After further culturing, the viruses were injected in day-old "Russian White" chicks, their virulence determined and their behavior in humans assessed in nasal polyps of adult humans. Results showed that recombination was accompanied by loss of reproductive capacity in chicken embryo fibroblasts. The incidence of the temperature-sensitive phenotype and the virulence of recombinant viruses varied significantly, but, although replacing one or two genes reduced virulence, replacement of as much as 3 segments of RNA did not lead to complete loss of virulence for chicks. The viruses did not multiply in human nasal polyps.

References 13: 2 Russian, 11 Western.

[230-12131]

UDC 616.001.4-022.7-089

CLOSED METHOD FOR TREATING MICROBE-CONTAMINATED WOUNDS

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 131, No 11, Nov 83 (manuscript received 1 Feb 83) pp 64-66

MITYUK, I. I. and BURYI, V. T., Department of Hospital Surgery, Vinnitsa Medical Institute imeni N. I. Pirogov

[Abstract] The benefits of closed treatment for microbe-contaminated wounds justify the development of special devices for such treatment. The present report relates the authors' experience in developing a bandage containing a membrane of polyethylene or similar transparent material, with provision for circulation of oxygen and healing aerosol substances and control of osmotic, hydrostatic and pressure values. Physical therapy and other treatment can be carried on while observing the healing process. Electrolyte, water and plasma levels can also be maintained, and electrocardiac stimulators to promote healing are connected to the bandage beforehand. Tests have shown that the bandage maintains vital fluids and promotes healing while providing a barrier to further infestation by anaerobic microflora and other contaminants. Figure 1; references 5 (Russian).  
[223-12131]

BRIEFS

SENSORY DEFICIENCY STUDIED--Sensory deficiency and ability to work--this was the theme of a joint out-of-town meeting of the Scientific Council for the Planning and Coordination of Research in Molecular Biology and Molecular Genetics in the Field of Medicine of the USSR Academy of Medical Sciences and the Presidium of the Siberian Department of the USSR Academy of Medical Sciences, held in Irkutsk. Participants focused on the following matters: the molecular-biological substrate of sensory support for functions of the body; the ultrastructural and biophysical bases of sensory perception and functional activity; the physiological mechanisms and clinical aspects of sensory deprivation. Sensory systems are vital to life support. A steady flow of information coming into the brain from outside is matched against information from the internal organs. This makes it possible for a living system to organize activities optimally on all functional levels. A deficiency or distortion of the information coming into the brain has an adverse effect on the body's life processes, disrupts its adaptive reactions, and reduces activity. [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 21 Oct 83 p 3] 12255

## PHARMACOLOGY AND TOXICOLOGY

### BRIEFS

DRUG DEVELOPERS RECEIVE AWARDS--Rewards for...cheerfulness--this is what we could call the bronze medal of the Exhibition of Achievements of the USSR National Economy and the Certificate of Honor of the International Fair in Poznan (Poland), which were awarded the other day to the biologically-active compounds Gipkos, Gipreks, Daugil, and Askatesh, which were developed by Kirghiz scientists. The compounds are based on tonics obtained from plants which are abundant in the republic, especially sea buckthorn [oblepikha]. It is not by chance, therefore, that their use markedly enhances man's physical stamina and mental alertness and reduces general fatigue in the body. They make people cheerful. The compounds have proved themselves not only in practical health care but also in sports and space medicine. They were used by Soviet alpinists who climbed Everest, by participants in Arctic and Antarctic expeditions, and by astronauts. The pharmacologists of Kirghizia are not resting on their laurels. This year alone the Department of Biopharmacology of the Kirghiz SSR Academy of Sciences Institute of Organic Chemistry, headed by Prof A. A. Altymyshev, received five authors' certificates and two positive decisions on inventions for their scientific work. Most of them relate directly to the adaptogens Gipkos, Gipreks, Daugil, and Askatesh. Work continues on further improvement of them. [Text] [Frunze SOVETAKAYA KIRGIZIYA in Russian 2 Dec 83 p 4] 12255

CSO: 1840/214

UDC 576.311.347

EFFECTS OF HORNET VENOM MASTOPARAN ON MITOCHONDRIA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 273, No 3, Nov 83  
(manuscript received 5 May 83) pp 747-750

SHOL'TS, K. F., ALIVERDIYEVA, D. A., SNEZHKOVA, L. G., MIROSHNIKOV, A. I.,  
and KOTEL'NIKOVA, A. V., Institute of Biochemistry imeni A. N. Bakh,  
USSR Academy of Sciences, Moscow

[Abstract] Mastoparans are small peptides isolated from insect venoms which act directly on various biological membranes. Evaluation of the effects of the 14-amino-acid mastoparan ( $\text{INLKAI AALVKKVL}(\text{NH}_2)$ ) isolated from the venom of *Vespa orientalis* was conducted with the rat hepatocyte mitochondrion serving as the target organelle. The mastoparan in question was found to uncouple oxidative phosphorylation, and plots of the rate of respiration versus mastoparan concentration yielded sigmoid curves. Transformed into log-log plots, the latter yielded a slope of  $2.1 \pm 0.1$  suggesting that the active form of the peptide is a dimer or that a unique interaction with membrane lipids prevails. The mechanism of action of this peptide was likened to that of gramicidin S and melittin, and its permeability is presumed to be predicated on thermal mobility of membrane lipids. Figures 4; references 12: 7 Russian, 5 Western. [152-12172]

UDC 576.311:577.15.04

EFFECTS OF T-2 TOXIN ON ULTRASTRUCTURE AND ORGANELLE-SPECIFIC ENZYMES IN RAT TISSUES

Leningrad TSITOLOGIYA in Russian Vol 25, No 11, Nov 83  
(manuscript received 1 Aug 82) pp 1264-1269

KRAVCHENKO, L. V., KHVYLYA, S. I., AVREN'YEVA, L. I., MOROZOV, I. A. and  
TUTEL'YAN, V. A., Institute of Nutrition, USSR Academy of Medical Sciences,  
Moscow

[Abstract] In view of the health danger represented by fungal toxins in the environment and the implication of *Fusarium* toxin, T-2, in human toxicoses, Wistar rats were treated intragastrically with 3.8 mg/kg of T-2 to study its effects on the ultrastructure and enzyme activities (succinate dehydrogenase, beta-glucosidase, beta-N-acetylglucosaminidase, acid RNase, glucose-6-phosphatase,

5'-nucleotidase) of the liver, thymus, and spleen. Studies conducted over a 72 h period showed that, in the liver, protein synthesis was progressively inhibited, there was a gradual decrease in the activities of most of the enzymes, the number of ribosomes decreased, and the membranes of the rough endoplasmic reticulum showed destruction. There was an early and pronounced destruction of all the membranous structures in splenocytes concomitantly with activation of the lysosomal system. The thymic changes included rapid onset of intercellular edema, swelling of the organelles, and death of individual thymocytes against a background of intense repair processes, infiltration with phagocytes, and activation of lysosomal hydrolases. It appears that a key mechanism in the effects of the T-2 toxin involved extensive disruption of the cell membranes. Figures 3; references 18: 6 Russian, 12 Western.  
[225-12172]

UDC 615.916:598.12

CONFIRMED CASE OF POISONING BY VENOM OF CENTRAL ASIAN COBRA (NAJA OXIANA)

Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 55, No 11, Nov 83  
(manuscript received 24 Apr 83) pp 113-114

KUDRYAVTSEV, S. V., Herpetology Section, Moscow Zoological Garden

[Abstract] Case description is provided of a 28 year old male herpetologist bitten on the right index finger by an adult male Central Asian cobra (*Naja oxiana*). The initial euphoria displayed by the subject was replaced within 15 min by depression and marked clinical deterioration, falling BP, and a falling respiratory rate (from 16 to 12/min) in combination with increasing physical weakness. Within 20-25 min of the bite the lower extremities were completely paralyzed and the patient became comatose. At this point he was treated with "Antikobra" antiserum (5 ml = 0.5 U) intravenously, with the remainder of the dose given subcutaneously. Respiration improved immediately and there was no need to apply artificial respiration. After five days of a stormy clinical course the patient recovered. These observations, in conjunction with the reports in the literature from India, confirm the need for instituting antiserum treatment as soon as possible and for its administration even to seemingly agonal patients. In addition, this case also demonstrates the clinical efficacy of the Soviet Antikobra antiserum. References 9: 8 Russian, 1 Western.  
[219-12172]

## REACTION KINETICS OF N,N-DIMETHYL-2-PHENYLAZIRIDINIUM WITH MUSCARINIC CHOLINE RECEPTOR AND ACETYLCHOLINESTERASES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 10, Oct 83  
(manuscript received 14 Jan 83) pp 1348-1355

PALUMAA, P. Ya., KYAEMBRE, T. Kh. and YARV, Ya. L., Tartu State University

[Abstract] Studies were conducted on the ionic sites of acetylcholinesterases (AChE) of the electric organ of the electric eel, cobra venom, and rat brain, and the sites of rat brain muscarinic choline receptor (MCR) by following the kinetics of their reaction with N,N-dimethyl-2-phenylaziridinium (DPA). Inactivation involves noncovalent binding of DPA and subsequent irreversible alkylation of protein groups located at the anionic site. Although DPA was found to bind with similar effectiveness to the enzymes and the receptor, in the latter case alkylation proceeded much more rapidly ( $k_a = 15 \times 10^4 \text{ sec}^{-1}$  for MCR,  $0.7-1.8 \times 10^4 \text{ sec}^{-1}$  for AChE). MCR was completely inactivated by alkylation in 1 h under the conditions employed (25°C, 0.15 M phosphate buffer, pH 7.5) and was ascribed to different solvation factors at the different sites. Studies with five solvents (dimethylsulfoxide, dimethylformamide, ethanol, 1,4-dioxane, acetic acid) indicated that solvent basicity is the key factor in acceleration of DPA solvolysis. Figures 6; references 22: 1 Czech, 6 Russian, 15 Western. [183-12172]

UDC 611.018.5-08

## ULTRASTRUCTURAL CHANGES OF RAT LARGE INTESTINE EPITHELIOCYTES DUE TO CHOLERA TOXIN

Leningrad ARKHIV ANATOMII GISTOLOGII I EMBRIOLOGII in Russian Vol 84, No 4, Apr 83 (manuscript received 10 Sep 82) pp 53-61

SHAKHLAMOV, V. A., BARKHINA, T. G. and ESHMIRZAYEV, M. E., Laboratory of Cell Pathology and Electron Microscopy (head, professor V. A. Shakhlamov) Institute of Human Morphology, USSR Academy of Medical Sciences, Moscow

[Abstract] Sixty male Wistar rats (160-180 g body wt) were injected with 0.3 mg/100 g body weight of cholera toxin into the jejunum under nembutal sedation. Pieces of the jejunum and colon were taken 10 minutes, 30 minutes, 1, 4, 6, 12 and 24 hours after injection. It was found that the toxin entered the large intestine quickly and its action was seen within 30 minutes after injection. After binding of the toxin in the columnar and goblet cells of the large intestine, there first arose biochemical changes, indicated by adenylate-cyclase activity within 30 minutes after injection of the toxin. Ultrastructural changes of various degree appeared 1 hour after injection and persisted for 24 hours. The cholera toxin stimulated mucous secretion by the goblet cells up to 12 hours after injection. Figures 4; references 28: 8 Russian, 20 Western. [159-2791]

EFFECT OF PSYCHOTROPIC AGENTS ON MOTIVATIONAL COMPONENTS AND SUCCESSFULNESS  
IN RAT OPERANT BEHAVIOR

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 95,  
No 6, Jun 83 (manuscript received 31 Dec 82) pp 65-68

BOBKOV, Yu. G. and MOROZOV, I. S., Act Protector Laboratory, Institute of  
Pharmacology, USSR Academy of Medical Sciences

[Abstract] The prevalence of uncorrectable results was used to evaluate the intensity of dominant avoidance motivation and the effect on it of various psychotropic drugs in rats. The animals were previously trained to avoid a painful electrical stimulus by depressing a pedal every 20 seconds. The correlation matrix method was employed to define a zone of uncorrectable results. It was found that lowering the strength of the negative reinforcement, by lowering the stimulus from 1 mA to 0.3 mA, widened the zone. Administration of diazepam or phenibut had a similar effect, with response at higher doses resembling that of poorly trained rats. Low doses of phenobarbital or sodium hydroxybutyrate did not change the zone of uncorrectable results, but did decrease the number of shortened intervals between pedal depressions. At higher doses these hypnosedatives widened the zone. Haloperidol and chlorpromazine caused the uncorrectable result zone to disappear and sharply decreased the number of short intervals. Amphetamine narrowed the zone at low doses and widened it at higher doses. The results indicate that the zone of uncorrectable results can quantitatively reflect the level of dominant motivational incentive. Tranquilizers suppress motivation formation, while nontranquilizing neuroleptics disturb coordination. Figures 1; references 14: 11 Russian, 3 Western. [154-12126]

DECREASE IN CONTENT OF SH-GLUTATHIONE AND IN ACTIVITY OF GLUTATHIONETRANSFERASE  
OF LIVER AS FACTOR POTENTIATING TOXICITY OF T-2 TOXIN

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 5, Sep-Oct 83 pp 135-137

KRAVCHENKO, L. V., AVREN'YEVA, L. I. and TUTEL'YAN, V. A., Laboratory of  
Enzymology, Institute of Nutrition, USSR Academy of Medical Sciences, Moscow

[Abstract] An important enzymatic detoxication process in the liver is the participation of glutathionetransferase (GT) in the formation of conjugates of foreign, toxic substances with SH-glutathione (SHG). This metabolic conversion of xenobiotics requires availability to the body of basic food substances, primarily, protein. The present article reports a study indicating that a dietary deficiency in protein lowers the concentration of SHG in the liver and decreases GT activity, thereby substantially potentiating the toxic action of T-2 toxin. Studies were done in male Wistar rats, 130 g, which were fed an isocaloric diet of either 18% (adequate) or 4% (deficient) protein, and were administered crystalline T-2 toxin. Rats in the 18% diet did not exhibit

reliable changes in liver SHG or in GT activity, nor change in activity of other enzymes assayed (alkaline phosphatase, arylsulfatase A and B, beta-N-acetylglucosaminidase, alpha-mannosidase). In contrast, rats on the 4% diet (+T-2 toxin) displayed profound intoxication; GT activity was lowered as compared to controls (and as compared to that of protein-deficient rats which did not receive the toxin). The protein-deficient rats, which received the T-2 toxin, displayed a sharp rise in alkaline phosphatase level (characteristic of T-2 toxicosis). Protein deficiency did lower the SHG level in the liver and the activity of the related GT. Evidence exists that conjugation of T-2 toxin (and of other 12, 13-epoxytrichotecener) with SHG is one of the important paths of their detoxication. References 10: 3 Russian, 7 Western.  
[231-8586]

## PUBLIC HEALTH

### KEY MEDICAL VISIT TO GEORGIAN SSR HEALTH FACILITIES

Tbilisi ZARYA VOSTOKA in Russian 23 Nov 83 p 2

[Article from "GruzINFORM": "Important Problems of Medical Workers"]

[Text] S. P. Burenkov, USSR Minister of Health, and Academician N. N. Blokhin, president, USSR Academy of Medical Sciences, have been present in Tbilisi for several days. They participated in the work of the republic's meeting of the party-economic active members on problems of public health and grand meeting of the presidium of the USSR Academy of Medical Sciences and the Georgian SSR Academy of Sciences together with the presidia of scientists of the medical councils of the USSR, RSFSR and Georgian Ministries of Health, which was dedicated to the 200th year of the Georgian friendship treaty between Russia and Georgia.

S. P. Burenkov and N. N. Blokhin familiarized themselves with the activity of the public health system of the republic, with the fact that Georgian medical workers have fulfilled the resolution of the June (1983) Plenum of the CPSU Central Committee, the directives of Comrade Yu. V. Andropov on increasing the level of medical aid and are ready to establish an annual system of dispensarization for the whole population of the republic.

They visited medical institutions, the republic's children's hospital, the children's rehabilitation and antiseptic centers, the Institute of Pharmaceutical Chemistry and Morphology of the Georgian SSR Academy of Sciences and the Scientific Research Institute of the Generative Function of Man of the Ministry of Health of the republic.

A high rating was accorded the organization of medical aid and the achievements of medical science in Georgia. S. P. Burenkov and N. N. Blokhin gave a positive evaluation to the activity of the children's rehabilitation and antiseptic centers and noted that the experience of their work deserves wide dissemination. The wish was expressed to broaden the functions of the rehabilitation center to be responsible here also for prevention of illnesses. They stressed the great importance of research conducted in the Institutes of Morphology and of Pharmaceutical Chemistry, in particular, in the field of obtaining interferon, and also methods for obtaining, first in this country, steroids from domestic [Soviet] raw material.

S. P. Burenkov and N. N. Blokhin noted work done in the republic on cooperation and partnership of institutions of the Ministry of Health with institutes of the Georgian Academy of Sciences. They indicated the expediency of broadening joint studies with the large medical scientific centers of the USSR Ministry of Health and the Academy of Medical Sciences.

Remarks and proposals were voiced on improving the activity of medical-prophylactic institutions of the republic, further intensification of studies in the field of medical sciences and its application to practical public health.

12410

CSO: 1840/217

#### BRIEFS

KAZAKH MEDICAL CENTER--A new medical center has been opened in Alma-Ata, the capital of Kazakh SSR. Over 10,000 patients can be treated in the new medical center in 1 year. The new center is the third to be opened in Kazakh SSR since the beginning of the current 5-year plan period. [Text] [Tashkent International Service in Uzbek 1700 GMT 1 Dec 83 GF] 8685 12410

KUZBASS SURGERY FACILITY OPERATIONAL--Kemerovo. The largest surgery facility in the Kuzbass, totaling 14,000 square meters, has gone into operation in the oblast clinical hospital. Teams of surgeons will be able to perform operations in seven operating rooms at once. A special monitoring system will help physicians to follow the course of an operation via patients' cardiograms. An inter-oblast kidney transplant center has also been located in the clinic. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 8 Jul 83 p 2] 12255

VILNIUS POLYCLINIC BUILT--In the course of carrying out the party's and government's decisions concerning further improvement and development of the health care system, the largest polyclinic in the Baltic region, accommodating 1,800 visits per shift, has been built on the Antakal'nis in Vilnius. Well-appointed offices for uchashtok therapists and narrow-profile specialists as well as modern laboratories have been built there. The new polyclinic is a kind of health resort as well: a municipal rehabilitation center has been set up in the two-story structure. Patients are served by various procedures of hydrotherapy and mud treatment, a pool, vertical baths, acupuncture and massage rooms, and there is a therapeutic physical culture hall. Yesterday the polyclinic was visited by comrades P. Grishkyavichus, A. Brazauskas, N. Dybenko, V. Sakalauskas, L. Shepetis, Lithuanian Communist Party Central Committee Department of Science and Educational Institutions Head V. Baltrunas, Health Minister I. Platukis, and Vilnius Gorispolkom Chairman A. Vileykis. The guests were conducted on a tour of the new health center by Vilnius Clinical Hospital Chief Physician R. Rimkyavichyus and heads of departments of the polyclinic. [Text] [Vilnius SOVETSKAYA LITVA in Russian 26 Nov 83 p 1] 12255

CSO: 1840/217

UDC 616-036.865(-202)(476.5)

PRIMARY DISABILITY OF COLLECTIVE FARM WORKERS: VITEBSK OBLAST

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 3, Mar 83  
(manuscript received 11 Nov 82) pp 13-15

SKOBLYA, Ye. S. and SKALYZHENKO, A. P., candidates of medical sciences,  
Belorussian Scientific Research Institute of Work Fitness Expertise and  
Occupational Therapy Administration

[Abstract] An analysis was carried out on primary disability of collective farm workers in the Vitebsk Oblast of Belorussia for the period covering 1966 to 1980. On an overall basis the incidence of primary disability decreased 2.8-fold during the indicated period of time. Within the overall statistical data the actual decrease in groups I and II was 3.3- and 3.0-fold, respectively, while that of the disabled falling into category III actually increased 1.5-fold. Cardiovascular diseases were the single most important factor leading to disability, closely followed by malignancies in the second place and trauma in the third place. On the basis of such an analysis more goal-oriented and rational measures can be taken to provide the collective farmers with appropriate medical, social and rehabilitative care. References 9 (Russian).  
[202-12172]

HEALTH OF POPULATION IS PARTY RESPONSIBILITY

Tbilisi ZARYA VOSTOKA in Russian 23 Nov 83 p 2

GRUZINFORM [Georgian SSR Propaganda Organ]

[Abstract] This extended article was written subsequent to the convening on 19 November of the Party-Aktiv of the GSSR at which national health problems were considered. Prevention of disease was re-affirmed as the national health policy. G. Lezhava, GSSR Minister of Health emphasized that a program of yearly dispensarization is to be pursued, i.e., preventive health checkups to forestall, or identify, pre-morbid states and thereby prevent their development. Another area of interest discussed was the favorable pharmaceutical supply situation and medical service at Georgian plants. It is said that the workers feel cared-for and this contributes to a good mental climate. Attention is devoted to establishing standardized hospitals, education of specialists and assigning them to rural hospitals appropriate to their training.

M. Chkhubianashvili, head of an ambulatorium [a small unit for ambulatory clinical service] spoke of the responsibility of such units to care for the workers. The meeting stressed the need for an individual approach to the patient by the physician. Qualifications of future physicians, training of medical cadres, strengthening medical facilities are party concerns. Figures are cited: The GSSR now has 6 All-Union-level health resorts [kurorts], 25 republic-level and 61 local resorts, plus 300 potential sites for such places. From the point of view of science support of health, the GSSR has 18 Scientific Research Institutes with their branches, and a medical institute, wherein 10,000 people are working. The republic scientists include 500 doctorate-level and 1200 candidate-level medical scientists; 30 have been members of the GSSR Academy of Sciences and of the USSR Academy of Medical Sciences. Special interest is merited by Georgian studies on oncology and cardiovascular diseases, brain structure and neurological diseases. Less noteworthy are shortcomings in medical apparatus supply. This latter problem is to be faced and overcome. [213-8586]

#### PHARMACY SERVICE

Moscow SOVETSKAYA ROSSIYA in Russian, 18 Nov 83, p 1

Unattributed Article in Source Newspaper

[Abstract] This article cites complaints about the pharmacy service, which the newspaper feels is a barometer of the status of service to the nation by the drug service. This article discusses the present situation in pharmaceutical service, using as an index the "letters to the editor". Not long ago that barometer of the situation revealed dissatisfaction with the pharmacies and with unavailability of prescribed drugs. The situation has apparently improved today. In Aksaysk Rayon, Rostov Oblast, a standing commission to monitor the status of medicinal supply to the people reports positive findings; key consumers, viz., veterans, chronic patients and children, are well served. Gorky Oblast has good service. The RSFSR has 15,000 pharmacies, and 50,000 pharmacy points; most outlets are favorably located. Pharmacies in Sverdlovsk, Novosibirsk and Tyumen have been awarded national commendation. Pharmacy-physician contact is strong. Supply is reliable; complaints are lacking; cause of unavailability is tracked down. Whereas the WHO suggested that 200 drugs would be adequate to meet the needs of patients, the Soviet arsenal of drugs is ten times that number. Supply of eyeglasses is not yet satisfactory; stock-control has deficiencies and sometimes the pharmacy shelves have drugs overlooked by the pharmacists, or, central depots have drugs not provided to peripheral stores; physicians may not be sufficiently informed of new developments, or mis-prescribe. The Communist Party functionaries and government bureaucrats are responsible to correct shortcomings in management and organizational forms. Achievement of needed improvements depends on interested individuals at the periphery under Soviet government control. [212-8586]

## EFFECT OF QUALITATIVELY-VARIED FEEDING ON MORBIDITY OF CHILDREN IN THEIR FIRST YEAR

Kishinev ZDRAVOOKHRANENIYE in Russian No 5, Sep-Oct 83  
(manuscript received 26 Oct 83) pp 14-17

GUTSUL, T. L. and GRINSHPUN, B. M., Department of Pediatrics, Faculty for the Advanced Training of Physicians, Kishinev Medical Institute; Rybnitskaya Central Rayon Hospital

[Abstract] The USSR has been making available a large number of special products for artificial feeding of infants. The Malysh and Malyutka mixtures have been used for about 10 years but few reports of their effect on the health of infant consumers have appeared. In the present study morbidity of three groups of children was examined: breast-fed, Malyutka and Malysh-fed and V-kefir, whole-kefir-fed. Disease incidence was clearly lowest in the breast-fed babies. The Malyutka and Malysh-fed displayed more acute gastrointestinal infections. The kefir-fed babies suffered more frequent respiratory tract infections. Disease incidence was generally greater in infants transferred early from breast to artificial mixtures and this was especially the case with the kefir product. Morbidity of children, on the three kinds of feeding, for the first 12 months, is charted by month. (The kefir-type product is described as an un-adapted, acid-milk, traditional mixture). References 10: 8 Russian, 2 Western.  
[227-8586]

UDC 362.7(47+57)

## STATE CONCERN FOR CHILDREN IN USSR

Moscow VOPROSY OKHRANY MATERINSTVA I DETSVA in Russian No 12, Dec 82  
(manuscript received 25 Jul 82) pp 7-12

STUDENIKIN, M. Ya. professor, academician of the USSR Academy of Medical Sciences, Moscow

[Abstract] This article reaffirms claims for success in Soviet health programs. Organization of medical care for children has a prophylactic character in the USSR. The nation, today, has 24,000 women's consultation offices, children's polyclinics and ambulatoria. Large pediatric polyclinics for 250-500 visits per shift are being constructed. Management of these polyclinics is being improved; the key figure is the uchastok physician, the home doctor who provides, with specialists, all the preventive and therapeutic work. An All-Union Scientific Research Center for Mother and Child Health Protection, a network of sanatoria, specialized boarding schools and pre-school institutions are a part of the places reflecting concern for children and which provide medical care for them. Laws have been enacted to guarantee child health care. In 1976 a standing commission on Problems of Labor and Living Conditions and Protection of Mothers and Children was set up in the Council of Nationalities

of the USSR Supreme Soviet. Numbers of pediatricians increase yearly. Research is underway on development of forms and methods of management of hospital-polyclinic and specialized pediatrics units, on physical development of nationalities, on health standards, on age-dependent health parameters and on education. New specialized food-products have been developed (e.g., Malyutka, Malysh, Vitalakt, Biolakt, Baldyrgan, Narine, Matsoni). Experimental clinical research is underway in internal medicine, mother and child relationships, fetal development, effects of medicines and infectious disease and hormones, perinatal nutrition and care, children's diseases and social problems. The forthcoming years will see further accomplishments in mother and child health care.  
[226-8586]

UDC 614.1:312.28(476)

#### SOME MEDICAL-SOCIAL ASPECTS OF DEMOGRAPHIC AGING IN BELORUSSIA

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 11, Nov 83  
(manuscript received 7 Apr 83) pp 10-17

MANULIK, A. V., candidate of medical sciences, Department of Social Hygiene and Organization of Public Health, Belorussian Institute for the Advanced Training of Physicians

[Abstract] A trend to increasing numbers of older people, which started in the early 60s, is noted in the population of BSSR. This trend is attributed to a lowering birth rate and average age at death protracted from 70 to 80. Data from the individual oblasts (based on a 1979 census) are tabulated; these clearly demonstrate the progressing aging of the demographic structure in the republic and the survival of older, even aged (80 and 90+) people. The prophylactic character of the health care in the nation is credited for the fact that the population remains healthier and lives longer than in earlier days; propaganda against bad habits, control of obesity, promotion of an active life and physical labor, "geriatrization" of the health service (i.e., casting medical care in terms of preventive dispensarization (regular check-ups) of people in their "third age"), all contribute to an older, healthier contingent in the population. The form of medical care organization exploits the uchastok hospital (a percentage of beds are set aside for older and aged patients--but not a separate, special hospital) as the first stage of care; the second stage is at the rayon, or inter-rayon hospitals (again, bed quotas for the elderly); the third stage is at the oblast level where a multi-profile, geriatric hospital should be available, plus a polyclinic--preferably with a day-time, available-bed unit; in this third stage, geriatric consultation will be available, oblast-wide. An in-patient unit for chronic patients should also be available at old-folks homes, on an oblast or inter-rayon level. References 12 (Russian)  
[218-8586]

## VETERINARY MEDICINE

### ANIMAL TUBERCULOSIS STUDIES

Minsk SEL'SKAYA GAZETA in Russian 30 Nov 83 p 2

[Article by Academician Kh. Goreglyad]

[Text] Livestock production in the BSSR is becoming an industrial production which is characterized by periodicity and continuousness of technological process, strong organization and sophistication of labor. However, biotechnology of industrial livestock presents definite requirements for the animal. And one of the main ones is health, a high immunobiological bodily resistance. Under conditions of concentration, specialization and intereconomic cooperation of livestock breeding, a large group of animals are crowded together with the stall contents. The role of an ecological approach to organization of prophylactic measures increases, especially with animal inspections, included in which prevention of tuberculosis occupies an important place. The problem of elimination of this disease is an important social-hygienic task of veterinary and medical sciences. Sick animals are one of the basic links in the epizootic chain and the epidemiological process. The urgency of theoretical scientific treatment of the tuberculosis problem has national economic and social importance. Great creative work was devoted to this problem in the publications of Doctor of Veterinary Sciences, Professor R. V. Tuzova, head of the chair of zoology at the Minsk Pedagogical Institute imeni A. M. Gorkiy. For more than 30 years she has devoted herself to the treatment of theoretical scientific aspects of the problem of tuberculosis and the adoption in agricultural production of the results of scientific studies. Her work on ecology, the interspecies migration of tuberculosis mycobacteria and the etiology, pathogenesis, pathomorphology, diagnosis and development of a series of measures for improving sanitation is basic. The problems of complete elimination of this disease and the coordination of antitubercular measures in medical and veterinary practice were first promoted by her in Belorussia. The introduction of theoretical scientific developments into agricultural production made it possible to eliminate tuberculosis completely in poultry, and this enabled the development of poultry production on an industrial basis by expansion of selection and breeding work in this sector. An ecological trend in carrying out prophylactic measures was made the basis for protecting the environment from interspecies migration of tuberculosis between farm animals and wild fauna. Professor R. V. Tuzova is the author of more than 160 scientific publications, including more than 80 on tuberculosis, and, of these, six are monographs. The book "Tuberculosis of Farm Animals and Poultry", published by "Uradzhay" in 1983 is a basic theoretical

scientific handbook on this disease. This monograph was named the best scientific book at the Moscow International Book Exhibition-Fair-83, where it received high critical acclaim. Three countries--The German Democratic Republic, the Polish People's Republic and Czechoslovakia--entered into contracts for republication of the book in those countries. "The Cycle of Work on the Tuberculosis of Farm Animals," by Dr R. V. Tuzova, which was nominated by the Minsk Order of the Red Banner of Labor, State Pedagogical Institute imeni A. N. Gorkiy at the BSSR state prize competition in 1984, is a great contribution to the science and practice of agricultural production for realization of the USSR Food Program.

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CSO: 1840/213

UDC 619:576.809.33:576.858.25.636.4

CULTIVATING ENZOOTIC ENCEPHALOMYELITIS VIRUS OF SWINE

Moscow VETERINARIYA in Russian No 11, Nov 83 pp 26-28

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[Abstract] The present study reports on tests to cultivate and assess resistance of swine kidney, spinal cord and lung cells to the pathogen of Teschen's disease, Picornaviridae Enterovirus, which is found throughout Europe. The virus was found to be most lethal in the kidneys of piglets, where it destroyed 70-90% of the cells in the culture within 2-3 days. Other factors, including the infecting dosage, length of cultivation before and after infection, changes in the medium before infection and selection of anti-bacterial agents, were also evaluated. Doses from  $10^2$  to  $10^8$  TCD<sub>50</sub>/ml of the virus titration were tested.

The growth medium used for the original cell culture was replaced with a support culture before administering the virus doses. Results showed that under optimum conditions, The Teschen's disease pathogen was viable in a titer of 8-9lg TCD<sub>50</sub>/ml. Further tests using swine kidney cells in suspension showed that, on the 5th to 6th day of incubation,  $10^{4.5}$  to  $10^{6.5}$  TCD<sub>50</sub>/ml had accumulated. Ultrasonic treatment brought increased infectiousness, and the sensitivity of swine kidney cells to the virus was found to be affected significantly by storage, mixing procedures and other external factors.

[231-12131]

UDC 619:614.47:636.5

DYNAMICS OF IMMUNOGLOBULIN FORMATION WITH AEROGENIC VACCINATION OF POULTRY

Moscow VETERINARIYA in Russian No 11, Nov 83 pp 31-32

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[Abstract] Results of study of the formation of IgA, IgM and IgG are given where separate or associated aerogenic vaccination of poultry has been conducted to control Newcastle's disease, infectious laryngotracheitis and

smallpox. The test animals included 150 Canadian Leghorn chicks. Results for separate and combined doses of the immunogens were identical. Maximum increases of IgA and IgM in the blood were noted after 14 days, followed by gradual decline. Immunogenesis in the inductive phase for IgA and IgM was followed by formation of IgG immunoglobulins in the productive phase.  
[231-12131]

UDC 619:616.935-085:636.4

#### SWINE DYSENTERY

Moscow VETERINARIYA in Russian No 11, Nov 83 pp 36-38

ZAVIRYUKHA, A. I., KHARCHUK, A. N. and BOBYLEV, V. N., Ukrainian Veterinary Scientific Research Institute

[Abstract] The pathogen for swine dysentery, *Treponema hyodysenteriae*, was studied in excrement diluted with water to a 1:10 solution. In test variants the spirochaetae were stored at room temperature for 90 days and at 5°C for more than 2 years. The pathogen, which may be transmitted to previously uncontaminated farms by small rodents or other animal carriers including man, affects piglets less than 6 months of age most readily, and is commonly encountered in early spring or late fall. Symptoms include grayish discoloration, emaciated appearance and loose, dark-brown fecal material. Laboratory studies identified the pathogen strain with microscopic and staining procedures. Preventive measures suggested include careful cleaning of facilities and treatment with caustic soda or formalin, other prophylactic measures and quarantine from both animals and man.  
[231-12131]

UDC 619.616.981.42-07

#### DIAGNOSIS OF BRUCELLOSIS IN BUFFALO

Moscow VETERINARIYA in Russian No 11, Nov 83 pp 69-71

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[Abstract] Long-term studies have shown buffalo to be significantly more resistant to brucellosis than domestic cattle. Certain problems remain of interest, such as diagnosis of brucellosis in a rose Bengal form, indirect hemagglutination reactions and other brucelline reactions. The present study considers these problems and seeks optimal variants for diagnosis in differing laboratory and field circumstances. Seroallergic, specificity and sensitivity tests were made on 24 yearling and adult buffalo infected with *Br. abortus* 54 virus. Serum from test animals was compared to that of buffalo at ranches with successful and unsuccessful records of brucellosis prevention. Results confirmed that agglutinates of the disease appeared in lower titers and disappeared more rapidly in buffalo than in cattle. Positive rose Bengal

reactions were recorded at serum-antigen ratios of 0.03:0.03 in 30.2% of cases, and at 0.03:0.015 in 59.4% of cases. The indirect hemagglutination reaction was found to result in 27.1% more positive reactions than the rose Bengal tests, and was also superior to other diagnostic titers. Serum inactivation was achieved by 15 minutes of heating at 64°C. The brucelline prepared at the All-Union Order of Lenin Institute of Experimental Veterinary Medicine was judged to be effective for such diagnosis only in sexually mature buffalo. [231-12131]

UDC 619.576.809.55:576.856.6

#### METHODOLOGY FOR DETERMINING SENSITIVITY OF TREPONEMA HYODYSENTERIAE TO ANTIBACTERIAL PREPARATIONS

Moscow VETERINARIYA in Russian No 11, Nov 83 pp 73-74

GOLIKOV, A. V., BUKHANOV, V. D. and BONDIK, V. V., Belgorod Branch, All-Union Institute for Experimental Veterinary Medicine

[Abstract] Prophylaxis and treatment of swine dysentery caused by *Treponema hyodysenteriae* have had contradictory results related to the empirical expectations of such treatment in the face of insufficient data on the pathogen's sensitivity to antibacterial agents. The authors studied antibiotics and other preparations using a semi-liquid tryptic-mucous agar produced from the mucous membrane of swine intestines. Results showed that *Treponema* cultures obtained from swine suffering dysentery reached their maximum growth in an anaerobic state at 37°C after 60-72 hours of cultivation. Expensive calf's serum was gradually replaced with cattle serum without slowing growth. *Treponema hyodysenteriae* was found to be sensitive to tilane at a 4.7 mcg/ml concentration, to streptomycin at 75 mcg/ml, to neomycin and endopharm at 75 mcg/ml and to other preparations at concentrations of from 300 to 60,000 mcg/ml. [231-12131]

UDC 619:576.807.7:616.988.25:636.4

#### DIAGNOSIS OF ENZOOTIC ENCEPHALOMYELITIS IN SWINE

Moscow VETERINARIYA in Russian No 11, Nov 83 pp 74-75

REVENKOVA, A. G., Scientific Production Laboratory for Combatting Diseases of the Young of Agricultural Animals, RSFSR Ministry of Agriculture

[Abstract] Enzootic encephalomyelitis of swine, or Teschen's disease, is a contagious viral disease manifested in acute non-suppurative encephalomyelitis and paralysis. It has nearly 100% mortality. The author studied suspected and proven cases in 1.5-6-month-old piglets and sows. Clinical symptoms observed included refusal to eat, foaming at the mouth and vomiting, irritability and other nervous disorders; autopsy revealed brain hyperemia in

fallen animals, but no changes in those slaughtered before death. A culture was made using the spinal cord and brain of deceased swine and used for laboratory tests to identify the Teschen's disease virus. The infectious titer was 5.5-5.7 Ig of TCD<sub>50</sub> before adding a specific antiserum, and 0-1.5 Ig after its addition, confirming that the cytopathogenic agent was the Teschen's disease virus. Strict hygienic and quarantine measures are recommended to prevent transmission of the disease to other swine herds.  
[231-12131]

## CONFERENCES

### PUBLIC HEALTH MEETING HELD IN MOLDAVIAN SSR

Kishinev SOVETSKAYA MOLDAVIYA in Russian 10 Dec 83 p 3

[Article by correspondent Atem: "Technology in the Service of Health"]

[Text] The tasks of workers of the Soviet-republic system "Medtekhnik", in the light of decisions of November (1982) and June (1983) Plenums of the CPSU Central Committee, were considered at All-Union meetings which were held on 8-9 December in Kishinev.

N. M. Shmakov, Deputy Minister, USSR Ministry of Health, summing up the meeting said, "The problem of preparation for introduction into our country annual, universal, dispensarization beginning in 1984 has occupied the center of attention of the meeting participants. Successful resolution of this important social problem is unthinkable without wide use of medical technology, which provides for early diagnosis of illnesses and considerably increases the quality and labor productivity of physicians and medical nurses. Now, a powerful stock of electrocardiographic and endoscopic instruments and X-ray apparatus with a lower radiation charge is available. Ultrasonic units permit observation of the work of the heart and its valves in motion and computerized tomography permits the obtaining of unique photographs of any internal organs and their parts.

The products lists and amount of technology for these goals are defined by the program of dispensarization developed by the USSR Ministry of Health. An increase in its production for complete satisfaction of the requirements of medical-prophylactic institutions is foreseen."

The importance of planned, goal-directed allocation of medical equipment, control over its correct use and reliability of indexes, and provision of prompt and qualitative repair was stressed at the meeting. Positive experience of work in this direction of the main administration of "Moldmedtekhnik" was noted. Participants at the meeting recommended the preparation of a profiling system for annual, universal, dispensarization for the population.

G. A. Orlov, responsible official of the CPSU, CC, and M. S. Planton, chief of the department of science and educational institutions of the Moldavian Communist Party Central Committee, participated in the work of the meeting.

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PUBLIC HEALTH CONFERENCE HELD IN MOLDAVIAN SSR

Kishinev SOVETSKAYA MOLDAVIYA in Russian 3 Dec 83 p 4

[Article by Atem: "Medical Workers in Council"]

[Text] Public health problems were considered at the republic's scientific conference of oncologists, which took place in Kishinev. N. L. Leshan, deputy Minister of Health of the republic, gave a report on the current state and future of the development planned for this service in Moldavia.

Urgent problems of earlier diagnosis, prophylaxis and treatment of illnesses were considered in reports and communications of Moldavian scientists and also of prominent specialists from Moscow, Leningrad, Kiev, Vilnius, Yerevan and other cities. It was noted that medical science in our country at the present time, has available a rich arsenal of means and a wide network of medical institutions for rendering specialized aid to the sick.

The Scientific Research Institute of Oncology, which is supplied with all necessary equipment of domestic and foreign production, provides this service in Moldavia. Recently, new specialized departments and laboratories were established here; a specific program for lowering morbidity and improving its diagnosis at early stages was developed. At the present time a progressive method of prophylactic dispensarization of patients [regular checkups] has been introduced. Associates of the institute are authors of dozens of patents and 150 innovations. They are all used in the practice of the work of departments and laboratories and this has enabled the quality and level of medical examination to be improved. To propagandize achievements of medical science and to increase the knowledge of physicians, associates of the institute annually conduct scientific-practical conferences in the rayons of Moldavia, republic seminars and extension [field trip] meetings of the Scientific Council.

At the conference, great attention was paid to problems of improving the organization of the oncology service, the diagnosis and quality of examination of the population and improving prophylactic work.

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## BRIEFS

TRANSCAUCASUS PSYCHOLOGY CONFERENCE--How do difficult working conditions for the off-shore oil industry affect the mind of man? What are the limits of the psychological "tolerance" of people in an occupation linked with long removal from family, far from solid land, and extreme situations? Can the matriculating student be helped to overcome stress as the result of conflicting situations of taking examinations with minimum losses for the personality? Psychologists study these and many other problems, most important of which are Soviet tasks in the field of basic science and its applied directions. The significance of their studies increases in the light of requirements of the June (1983) Plenum of the CPSU Central Committee. The party and the state expect from the scientists and social scientists, including psychologists, it was indicated at the Plenum, the development of reliable ways to increase production efficiency, studies of the internationalization of social life, development of the socialistic sovereignty of the people, public conscience and problems of communist upbringing. The tasks for further development of the science of psychology and the means for raising its contribution to the practice of building communism were considered at the 9th Transcaucasus Psychologists Conference, which opened on 17 November at the Azerbaijan State University imeni S. M. Kirov. Among its participants, in addition to scientists from Azerbaijan, Georgia and Armenia were their colleagues from Moscow, Leningrad, Kiev and Tallin.

R. B. Feyzullayev, first deputy of the Ministry of Higher and Secondary Specialized Education of the AzSSR, opened the conference. Reports of Professor Ye. V. Shorokhova, deputy director of the Institute of Psychology of the USSR Academy of Sciences, Professors A. S. Bayramov and Sh. A. Nadirashvili, chairmen of the Azerbaijan and Georgian departments of the USSR Society of Psychologists and Candidate of Technical Sciences K. O. Santrosyan, deputy chairman of the Armenian department, were devoted to problems of the shaping of the new man and basic directions and prospects for the development of the science of psychology. For two days scientists reported and deliberated at the section meetings on general, aging, pedagogical, medical and social psychology problems and the psychology of creativity, work, sport and other aspects of this science. [By AZERINFORM] [Text] [Baku BAKINSKIY RABOCHIY in Russian 18 Nov 83 p 3] 12410

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XI ALL-UNION CONGRESS OF PEDIATRICIANS

Moscow VOPROSY OKHRANY MATERINSTVA I DETSTVA in Russian No 9, Sep 83 pp 71-76

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[Abstract] The Eleventh All-Union Congress of Pediatricians was held in Moscow during 30 Nov-3 Dec '82. Current problems of health protection of children in the USSR were discussed at this congress along with problems of physiology and pathology of infants, allergies and various allergic diseases, etc. Considerable attention was devoted to prenatal care and care of expectant mothers. Special consideration was given to medical care in rural situations. A series of papers was devoted to specific problems and achievements in various republics of the USSR. Organization of infant care during the first year was the subject of several papers. Attention was also given to genetic inheritance and the effect of environment on the health of babies. A separate session addressed nutritional problems during early development. In the series of papers on immunology special attention was given to allergic problems, their diagnosis and treatment. The congress was attended by representatives from all republics and guests from 16 foreign countries (Philippines, Finland, Poland, Bulgaria, Yugoslavia, GDR, Mongolia, Hungary, and others).  
[170-7813]

UDC: 613.646:614.89

SETTING STANDARDS FOR MICROCLIMATE AND WORK TIME WITH USE OF INDIVIDUAL PROTECTIVE GEAR

Moscow GIGIYENA I SANITARIYA in Russian No 12, Dec 82 (manuscript received 22 Apr 82) pp 65-68

[Article by D. V. Makukhin, Yu. G. Pletenskiy, S. P. Raykhman and L. M. Rimskaya, Institute of Biophysics, USSR Ministry of Health, Moscow]

[Text] Setting standards for the industrial microclimate is among the problems of hygiene that have been worked on considerably. However, there has been less intensive regulation of microclimate of individual protective gear (IPG), as well as of the environment when using such gear. This was apparently due to the limited use of IPG, particularly of the insulating type, and its sporadic use (mainly for performance of work in accident situations, repairs and decontamination). However, the existing expansion of areas of use of protective equipment in the national economy in exploration of space and deep waters made it necessary to investigate thoroughly questions of regulating the IPG microclimate. This is all the more important since IPG is often used at high ambient temperatures. Moreover, the gear itself could make it extremely difficult for the body to give off heat. Overheating due to these factors cannot help but affect man's work capacity.

Maintaining a stable level of work capacity is a typical sign of permissible thermal state of the body (S. M. Gorodinskiy et al.). This can be provided during the work shift under the microclimate conditions stipulated in GOST SSBT 12.1.005-76, "Air in Work Zones," for working in special work clothing that has an insignificant effect on the body's heat emission. The parameters for microclimate when working in special clothing and other IPG that make heat emission difficult have not been standardized in that document. At the same time, their use requires lowering of ambient temperature in work zones or restriction of work time, or else the availability of individual systems for artificial heat regulation, that make it possible to maintain given microclimate parameters in the space underneath the suit. The latter method has gained popularity chiefly with use of insulating suits that are designed to protect man against extreme external factors. Ventilation of the space underneath suits, use of cooling panels through which water is passed are the most popular methods of artificial regulation of temperature.

Implementation of any of the above means of maintaining a permissible thermal state of the human body requires scientific validation. It should be based on

experimental data characterizing the relationship between microclimate parameters determining the intensity of body heat emission into the environment, work load and permissible duration of work. In turn, establishment of this relationship requires definition of physiological criteria for the permissible thermal state of the human body. Authors have tried to fill some of the gaps referable to this problem, concentrating mainly on insulating suits, i.e., protective gear with maximum protective efficacy but, at the same time, having the most significant effect on heat exchange between the body and environment.

Table 1. Possible maximum levels of stabilization of parameters of the body's thermal status ( $M \pm m$ )

| Work     | Mode | WMST, °C        | RT, °C          | Heat content, kcal/kg | HR/min      |
|----------|------|-----------------|-----------------|-----------------------|-------------|
| Heavy    | 1    | $35.6 \pm 0.18$ | $37.9 \pm 0.08$ | $30.9 \pm 0.13$       | $136 \pm 5$ |
|          | $n$  | 4               | 10              | 8                     | 6           |
|          | 2    | $35.5 \pm 0.1$  | $37.8 \pm 0.04$ | $30.8 \pm 0.03$       | $135 \pm 2$ |
|          | $n$  | 37              | 31              | 39                    | 35          |
|          | 3    | $35.9 \pm 0.2$  | $37.8 \pm 0.12$ | $30.9 \pm 0.12$       | $132 \pm 4$ |
|          | $n$  | 6               | 5               | 4                     | 5           |
| Moderate | 1    | $36.0 \pm 0.04$ | $37.7 \pm 0.04$ | $31.0 \pm 0.1$        | $123 \pm 4$ |
|          | $n$  | 4               | 5               | 4                     | 6           |
|          | 2    | $35.7 \pm 0.1$  | $37.8 \pm 0.1$  | $30.8 \pm 0.1$        | $125 \pm 5$ |
|          | $n$  | 38              | 34              | 32                    | 29          |
|          | 3    | $35.7 \pm 0.19$ | $37.6 \pm 0.12$ | $30.7 \pm 0.12$       | $122 \pm 4$ |
|          | $n$  | 4               | 5               | 4                     | 6           |
| Light    | 1    | $35.6 \pm 0.24$ | $37.6 \pm 0.05$ | $30.6 \pm 0.07$       | $114 \pm 6$ |
|          | $n$  | 5               | 6               | 6                     | 5           |
|          | 2    | $35.7 \pm 0.2$  | $37.8 \pm 0.14$ | $30.8 \pm 0.09$       | $115 \pm 4$ |
|          | $n$  | 6               | 6               | 7                     | 6           |
|          | 3    | $35.6 \pm 0.19$ | $37.7 \pm 0.12$ | $30.7 \pm 0.11$       | $111 \pm 6$ |
|          | $n$  | 5               | 6               | 5                     | 6           |

Note:  $n$  is number of experiments.

A total of 349 experiments were performed in a 17-m<sup>3</sup> microclimate chamber. They involved the participation of 28 healthy subjects 18-35 years of age. Insulation suits worn over underwear and cotton clothing were used as objects of investigation only in some experiments, since this approach made it difficult to obtain graded combinations of microclimate parameters inside the suit.

For this reason, an experimental model was created, in which the subject wore only cotton clothing over his underwear, while the microclimate of the interior of insulating IPG was simulated by the microclimate of the chamber (air temperature and humidity 10 to 50°C and 20 to 100%, respectively). The temperature of the air and chamber walls was virtually the same. Air velocity was 0.2-0.5 m/s, i.e., it was close to this parameter under the suit. When changing the microclimate from one experiment to another, the temperature range constituted 2-5°C and humidity 5-10% or more. In each experiment, the subject performed light, moderate or heavy physical work (constituting 30-35, 45-55 and 70-80 W, respectively) under the set microclimate conditions in one of the following modes: continuous work (1st mode), 40 min work and 20 min

rest (2d mode), 20 min work and 40 min rest (3d). Maximum duration of the experiment was set at 6 h. During the test, using a type SK-2 measuring complex, which was developed at the Leningrad "Biofizpribor" [Biophysical Instruments] Special Design and Technological Office, and a type UM-1 control computer, we recorded automatically the rectal temperature (RT), weighted mean skin temperature (WMST) at 5 points (forehead, chest, hand, thigh, leg), mean body temperature, heat content of the body, heart rate (HR) according to R-R intervals, as well as temperature between the body surface and underwear in the region of the chest, back and lower leg using dry and wet thermometers; in addition, we measured energy expended and fluid loss in the subjects. The results were submitted to statistical processing using Student's criterion.

Table 2.

Top range of permissible temperature in space under suit as a function of humidity and intensity of work during shift

| Relative humidity, % | Temperature, °C |               |       |                  |
|----------------------|-----------------|---------------|-------|------------------|
|                      | light work (I)  | moderate work |       | heavy work (III) |
|                      |                 | (IIa)         | (IIb) |                  |
| To 40                | 36              | 34            | 32    | 29               |
| To 70                | 34              | 32            | 30    | 27               |
| To 100               | 33              | 29            | 28    | 25               |

Note: Here and in Table 3, work categories are indicated according to GOST 12.1.005-76

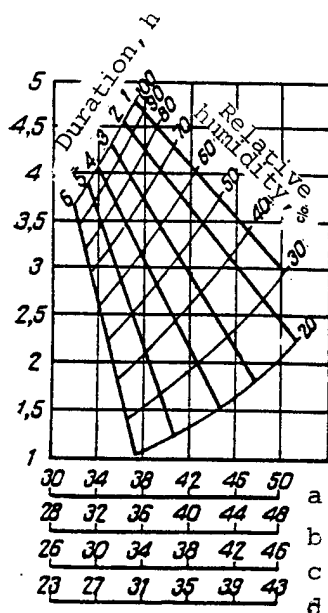
Table 3.

Permissible work time (h) when wearing unventilated insulating gear as a function of ambient temperature in work zone

| Air temp., °C | Light work (I) | Moderate work |       | Heavy work (III) |
|---------------|----------------|---------------|-------|------------------|
|               |                | (IIa)         | (IIb) |                  |
| 50            | 0.5            | 0.3           | 0.25  | 0.15             |
| 45            | 0.5            | 0.3           | 0.25  | 0.15             |
| 40            | 0.7            | 0.5           | 0.3   | 0.25             |
| 35            | 1              | 0.75          | 0.4   | 0.25             |
| 30            | 1              | 1             | 0.75  | 0.3              |
| 25            | 2              | 1.5           | 1     | 0.7              |
| 20            | 6              | 4             | 3     | 2                |
| 15            | 12             | 8             | 5     | 3                |
| 10            | 12             | 8             | 5     | 4                |

The three most typical variants of dynamics of parameters characterizing the body's thermal status are observed with work in the constant mode under conditions leading to restriction of heat emission: stabilization unlimited in time, which is indicative of thermal equilibrium with the environment, stabilization that is limited in time, which alternates with progressive overheating, and rise of parameters indicative of continuous accumulation of heat in the body. For example, in a subject wearing a cotton suit, the first variant is encountered during performance of moderate work at temperatures below 32°C (relative humidity 50-60%), the second is encountered at 32-36°C and the third at higher temperatures).

A thermal status with which man's work capacity holds at a relatively high and stable level can be considered permissible. Heat stabilization of the body is a mandatory condition for such work capacity. This warrants consideration of thermostabilization in general as the typical sign of a permissible thermal state of the body and, accordingly, the microclimate conditions that provide for it are permissible. When there is thermostabilization that is limited in time, we can discuss admissibility of microclimate conditions only as they relate to working for a specific period of time.



Admissible working time as a function of intensity of work and microclimate in space within insulating IPG

X-axis, temperature (°C) during light (a), moderate (b and c, respectively) and heavy (d) work; y-axis, water vapor pressure (in  $10^3$  Pa)

vary over a rather narrow range, regardless of intensity and mode of work, and do not exceed 38°C and 31 kcal/kg (130 kJ/kg), respectively. In only a few experiments we observed stabilization of RT at 38.2-38.3°C and heat content at 31.2 kcal/kg (130.7 kJ/kg), but this was exceedingly rare. Highest level of WMST stabilization was 35.5-36.0°C. While this parameter exceeded the indicated level at the early stage of overheating (first hour of the experiment), there was subsequent continuous elevation of WMST and, consequently, accumulation of heat in the body.

The maximum level of stabilization of HR varied, depending on intensity of performed work. Work mode had virtually no effect on this level.

Disruption of stabilization of parameters and further continuous elevation of these parameters in the second mode of work consistently preceded the subject's refusal to continue with the test. This circumstance warrants the belief that this critical moment, i.e., time of disruption of stabilization, could be used as a criterion of permissible working time, as well as of microclimate parameters for work of limited duration.

With the third variant, i.e., continuous accumulation of heat in the body, one can regulate working time on the basis of the level of overheating that was defined as the top limit of thermostabilization in analyzing the first and second variants--130 kJ/kg.

Table 4.

Body fluid loss under microclimate conditions permissible for working for different periods of time and at different intensities

| Work     | Working time, h | Fluid loss, g/h | Number of experiments |
|----------|-----------------|-----------------|-----------------------|
| Light    | 6               | 330±15          | 29                    |
|          | 4               | 490±26          | 24                    |
|          | 2               | 540±27          | 23                    |
| Moderate | 6               | 330±17          | 37                    |
|          | 4               | 480±24          | 33                    |
|          | 2               | 590±29          | 30                    |
| Heavy    | 4               | 390±22          | 36                    |
|          | 2               | 640±34          | 32                    |

The top limit of permissible thermal state of the body is characterized by maximum levels of stabilization of parameters determining this state, which is noted in both the first and second modes (Table 1). Table 1 shows that maximum levels of stabilization of RT and heat content

These criteria were used to set the top limit of the permissible zone of a heating microclimate for work differing in intensity and duration, as well as for determination of permissible working time with given microclimate parameters for the space under the protective gear.

The top limit of interior temperature when performing work throughout the shift is shown in Table 2. Permissible working time as a function of microclimate parameters of insulating IPG with forced ventilation is illustrated in the Figure.

Analogous criteria can be used also to regulate working time as a function of ambient temperature in the work zone. The results of setting such standards in the case of unventilated, insulating protective gear are listed in Table 3.

We also determined the intensity of perspiration that provides for retention of a relatively thermostable state under microclimate conditions that are permissible for specific working time and intensity (Table 4). This information may be useful in assessing both the thermal state of the body with consideration of intensity and duration of work, and for planning systems for artificial heat regulation in insulating IPG's.

The permissible microclimate parameters listed here were included in the "Physiological and Hygienic Specifications for Individual Insulating Protective Gear" (1981).

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CSO: 8144/0338

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INVOLVEMENT OF ORIENTING-SEEKING RESPONSE IN FORMATION OF SECOND SIGNAL  
ASSOCIATIONS IN LECTURE LEARNING

Moscow BIOLOGICHESKIYE NAUKI in Russian No 6, Jun 83  
(manuscript received 10 Dec 81) pp 45-49

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[Abstract] Six students attending a two-hour lecture on "Mechanisms of Crystal Coprecipitation" were tested for retained knowledge, and the results correlated with galvanic skin response (GSR) dynamics measured during the lecture. Analysis of the results of the test and intensity of the GSR demonstrated a positive correlation, indicating that the GSR--as an autonomic component of the orienting and seeking response--reflects acquisition of knowledge, i.e., formation of abstract and logical associations. It appears that the GSR may be used to monitor the functional status of higher nervous activity in response to lectures and to evaluate the effectiveness of various lecturing techniques. Figures 1; references 7 (Russian).  
[143-12172]

UDC 577.37:591.044.2

FUNDAMENTAL PRINCIPLES OF ORGANIZATION OF ION CHANNELS WHICH DETERMINE  
ELECTRICAL EXCITABILITY OF NERVE MEMBRANES

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian  
(manuscript received 21 Dec 82) pp 333-339

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[Abstract] A comparative study was conducted on the fundamental features of sodium and calcium channels in nerve membranes in mollusks and rats. While the sodium channels retain essentially identical characteristics throughout the evolutionary scale, calcium channels can differ by the presence of external receptor sites that are specific for the binding of divalent cations. The latter serve to maintain selectivity for the divalent cations and exclude monovalent cations. In addition, ionic flow through the channels may be

metabolism-dependent or independent, and in the former case an appropriate intracellular concentration of cAMP ( $10^{-5}$  to  $10^{-6}$  M) is required for calcium channel function. It appears, therefore, that the molecular mechanisms underlying electrical excitability of nerve membranes are quite similar throughout the evolutionary spectrum. References 27: 4 Russian, 23 Western.  
[228-12172]

UDC 591.488.4:591.544:599.82

SCANNING ELECTRON MICROSCOPY OF LABYRINTH IN HYPOKINETIC MACACA MULATTA

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian  
(manuscript received 1 Feb 83) pp 369-373

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[Abstract] Scanning electron microscopy was employed in the evaluation of the effect of prolonged hypokinesia (7 to 19 days) on the labyrinthine structures of the internal ear of *Macaca mulatta* monkeys, in order to simulate the physiological consequences of space flight on the auditory apparatus. Evaluation of the results indicated that in this species the clinostatic and orthostatic conditions employed were not sufficient to induce any discernible changes, in comparison with control animals. Subtle biochemical and cytochemical changes that may have taken place would have to be investigated by other methods. Figures 4; references 30: 10 Russian, 20 Western.  
[228-12172]

CSO: 1840

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